BlackDiamond X8 Series Switches Hardware Installation Manual

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Preface

This guide provides the instructions and supporting information needed to install the Extreme Networks® BlackDiamond® X8 series switch.

The guide includes information about site preparation and switch functionality.

Using Hardware Publications Online

You can access hardware publications at the Extreme Networks website (www.extremenetworks.com). Publications are provided in HTML, ePub, and Adobe® PDF formats.

To navigate this guide online, use the table of contents found in the navigation bar on the left. You can also use the **prev | next** links at the top and bottom of the page.

To download the publications in PDF or ePub format, click the links below:

BlackDiamond X8 Installation Manual PDF
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Audience

This guide is intended for use by network administrators responsible for installing and setting up network equipment.

This guide assumes a basic working knowledge of:

- Local area networks (LANs)
- Ethernet concepts
- Ethernet switching and bridging concepts
- Routing concepts
- Simple Network Management Protocol (SNMP)
- Basic equipment installation procedures

See the ExtremeXOS Concepts Guide and the ExtremeXOS Command Reference Guide for information about configuring the BlackDiamond X8 series switch.

Note

If the information in an installation note or release note shipped with your Extreme Networks equipment differs from the information in this guide, follow the installation or release note.

Conventions

The following tables list conventions used throughout this guide.

Table 1: Notice Icons

Icon	Notice Type	Alerts you to...
	Note	Important features or instructions.
	Caution	Risk of personal injury, system damage, or loss of data.
	Warning	Risk of severe personal injury.

Table 2: Text Conventions

Convention	Description
`Screen displays`	This typeface represents information as it appears on the screen, or command syntax.
Words in italicized type	Italics emphasize a point of information or denote new terms at the place where they are defined in the text. Book titles are printed in italics.

Related Publications

The documentation set for Extreme Networks ExtremeXOS® switches and routers includes:

- *ExtremeXOS Concepts Guide*
- *ExtremeXOS Command Reference Guide*
- *ExtremeXOS Release Notes*
- *BlackDiamond® 20800 Series Switches Hardware Installation Guide (legacy product)*
- *BlackDiamond 10808 Switch Hardware Installation Guide (legacy product)*
- *BlackDiamond 12800 Series Switches Hardware Installation Guide (legacy product)*
- *BlackDiamond 8800 Series Switches Hardware Installation Guide*
- *BlackDiamond X8 Series Switches Hardware Installation Guide (this guide)*
- *Summit Family Switches Hardware Installation Guide*
- *Extreme Networks E4G Series Routers Hardware Installation Guide*
- *Extreme Networks Pluggable Interface Modules Installation Guide*
- *ExtremeXOS Hardware and Software Compatibility Matrix*

Hardware and software documentation for Extreme Networks products is available from the Extreme Networks website. You can download software concepts guides and reference guides, hardware installation guides, and other documents at: www.extremenetworks.com/go/documentation.

Under your product warranty or with a current support contract, you can access software release notes and entitled software from the eSupport web pages at: http://www.extremenetworks.com/go/eSupport/

Note

You must have an active support agreement or a product registered to you in order to receive an eSupport login and access to Extreme Networks software release notes. To request an eSupport user name and password, select the **Request Web Login** link on the eSupport home page.

For instructions on accessing and downloading software and software release notes, see the Technical Assistance Center User Guide at: www.extremenetworks.com/go/tacuserguide

You can see complete information about all of our services online at: www.extremenetworks.com/solutions/service-solutions.aspx

1 BlackDiamond X8 Series Switches

BlackDiamond X8 Overview
BlackDiamond X8 Chassis Features
Management Module Ports Overview

The following sections provide an oveview of the BlackDiamond X8 Series Switches:

- Switch Overview
- BlackDiamond X8 Chassis Features on page 8
- Management Module Ports Overview on page 11

BlackDiamond X8 Overview

The BlackDiamond X8 series switches are chassis-based switches designed for virtualized data centers and high-performance compute cluster installations. They provide high-density, line rate 10/40 GbE ports. For more information about configuring a BlackDiamond switch, see the ExtremeXOS Concepts Guide and the ExtremeXOS Command Reference Guide.

The features of these switches include:

- Hot-swappable I/O modules that can provide:
  - 10-Gigabit fiber or copper ports.
  - 40-Gigabit Ethernet ports.
  - Ability to connect using direct atttach copper cables, active optical fiber cables, and SFP+ or QSFP+ optical modules.
- 2.3µ Sec port-to-port latency
- Redundant management modules that provide the CPU control subsystem
- N+1 redundant switch fabric modules that provide the active switching fabric
- Redundant, load-sharing, hot-swappable power supplies
- Field-replaceable, hot-swappable fan trays
- 20+ Tbps switching capacity
- 1.28 Tbps bandwidth per slot

Depending upon installed modules, many configurations are possible including:

- 768 ports of 10GbE SFP+ per switch, 2,304 ports per rack
- 384 ports of 100/1000/10000MbE RJ45 per switch, 1,152 ports per rack
- 384 ports of 1GbE SFP per switch, 1,152 ports per rack (using 10GbE)
- 192 ports of 40GbE QSFP+ per switch,576 ports per rack

BlackDiamond X8 Chassis Features

The BlackDiamond X8 switch chassis has the following physical features:

- Height of 14.5 RU, allowing three switches to be installed in a 7-foot tall, standard 19-inch rack
- Optional mid-mount brackets for flexibility in rack positioning
- Horizontal front slots for I/O modules and management modules
  - Eight full-width slots for IO modules
  - Two half-width slots for management modules (MMs)
- Four vertical slots in the back (behind fan trays) for fabric modules (FMs)
- Eight bays in the front for redundant power supplies; rear-accessible power connections
- Five vertical fan trays at the back
- Two connectors for an ESD-preventive wrist strap
  - On the front panel between the management modules
  - On the back panel at the top right corner

The figure below shows a BlackDiamond X8 chassis equipped with management modules and I/O modules.

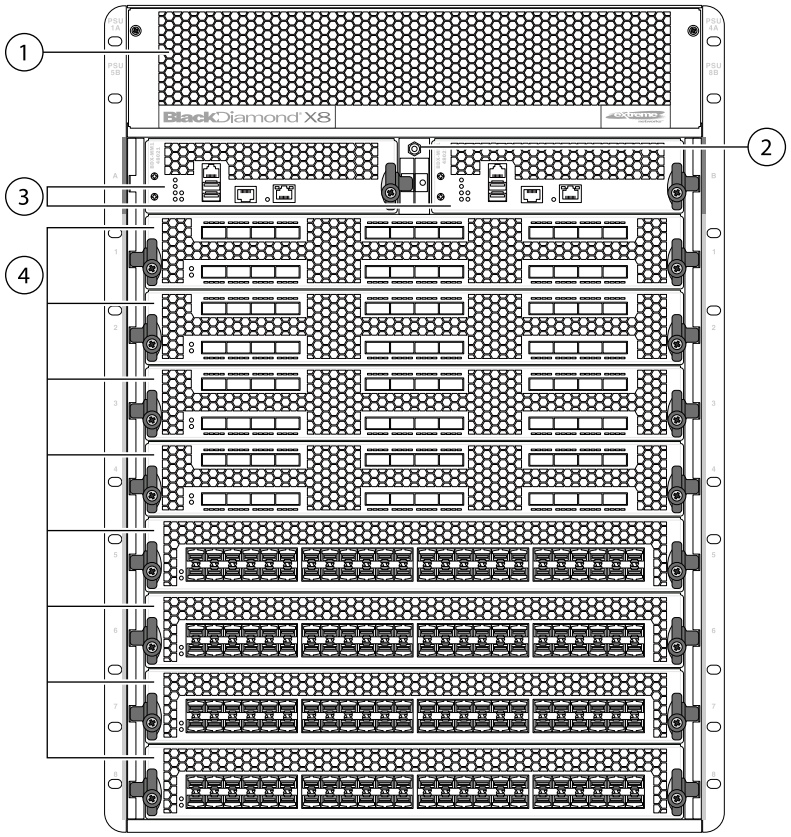

Figure 1: Front of the BlackDiamond X8 Chassis

1 = Power supply cover	3 = Management modules
2 = ESD jack	4 = I/O modules

The front of the chassis provides access to:

- Card cage for the management modules and I/O modules
- Bays for redundant power supplies, with ventilated cover

- Connection point for ESD-preventive strap

The following figure shows the back of the BlackDiamond X8 chassis.

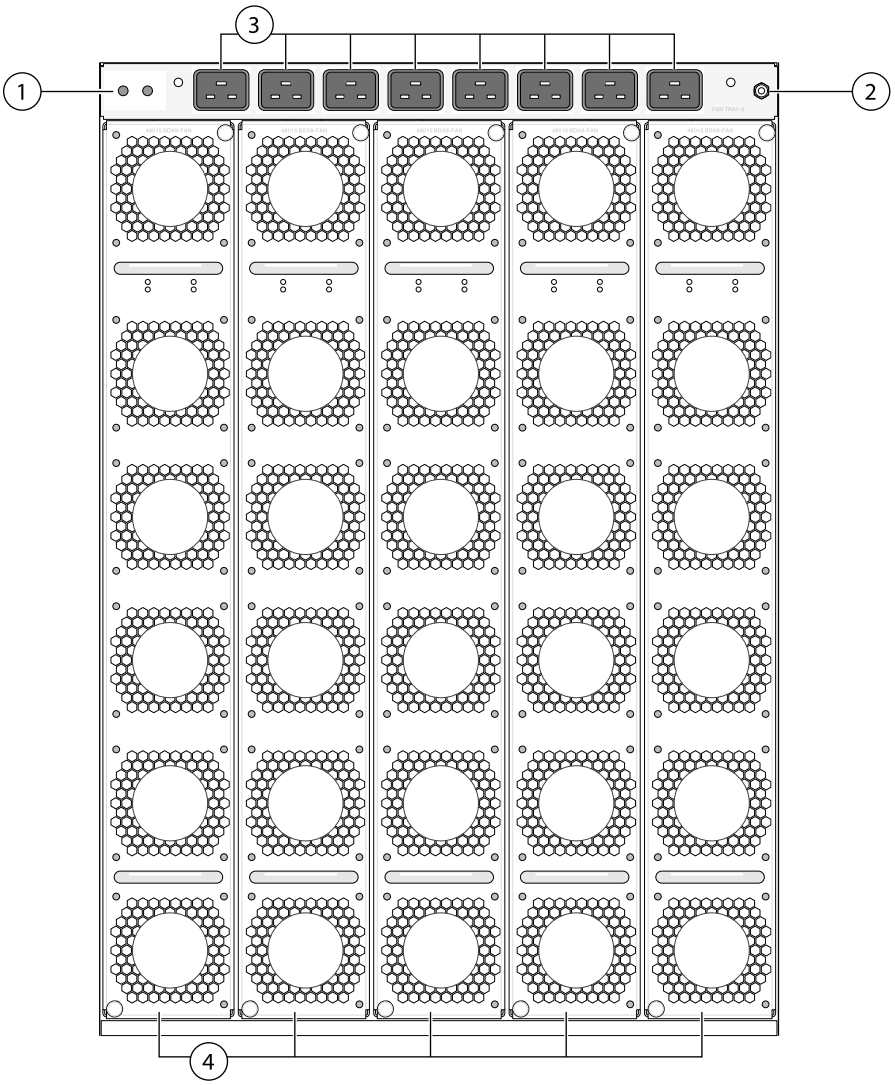

Figure 2: Back of the BlackDiamond X8 Chassis

1 = Grounding point	3 = AC power input connectors
2 = ESD jack	4 = Fan trays

The back of the chassis provides access to:

- Eight AC power input connectors
- Five vertical fan trays
- Four fabric module slots behind the fan trays
- Connection point for ESD-preventive strap
- Attachment point for optional chassis ground ("1" in the Figure 2: Back of the BlackDiamond X8 Chassis on page 10)

Management Module Ports Overview

Each BlackDiamond management module (MM) has a 10/100/1000BASE-TX Ethernet management port.

The management port enables direct communication with the central processing unit (CPU) of the switch. IT personnel can plug an Ethernet cable directly from a laptop into the management port for direct access into the switch. This access allows viewing and local management of the switch configurations.

USB ports on the management module allow you to attach a single USB 2.0 flash drive. Only a USB flash drive that is formatted using the file allocation table (FAT) file system is recognized on these ports. Other devices, such as a USB external hard drive, will not be mounted.

For more information, including a diagram showing the location of the management module ports, see Features of the Management Module on page 14 .

2 BlackDiamond X8 Series Modules and Fans

Module Overview
Understanding Management Modules
Understanding I/O Modules
Understanding Fabric Modules
Understanding Fan Trays

The following sections provide information on the BlackDiamond X8 Series modules and fans:

- Module Overview on page 12
- Understanding Management Modules on page 13
- Understanding I/O Modules on page 16
- Understanding Fabric Modules on page 21
- Understanding Fan Trays on page 22

Module Overview

Modules for the switch include management modules, I/O modules, and switch fabric modules. Each module for the switch consists of a printed circuit board mounted on a metal panel. The module carrier also includes ejector/injector levers and captive retaining screws on the module front panel.

Table 3: Modules Available for the BlackDiamond X8 Series Switch

Module Type	Short Description	Long Description	Manufacturing No. (SKU)
Management module	BDX-MM1	Management Module 1 for BlackDiamond X series chassis. two modules required for 1+1 redundancy.	900848-10
Switch fabric module	BDXA-FM20T	5.12Tbps Fabric Module for BlackDiamond X chassis. Minimum three modules required for wirespeed performance, four required for N+1 redundancy supporting full 20Tbps.	900849-10
	BDXA-FM10T	2.56Tbps Fabric Module for BlackDiamond X chassis. Minimum three modules required for wirespeed performance, four required for N+1 redundancy supporting full 10Tbps.	900850-10

Table 3: Modules Available for the BlackDiamond X8 Series Switch (continued)

Module Type	Short Description	Long Description	Manufacturing No. (SKU)
I/O module	BDXA-10G48X	48-Port 10GBASE-X SFP+ module for BlackDiamond X series chassis. Up to eight modules in the BlackDiamond X8 chassis support up to 384 wirespeed 10GbE ports and work with either 2.56 or 5.12Tbps Fabric Modules.	900851-10
	BDXA-40G24X	24-Port 40GBASE-X QSFP + module for BlackDiamond X series chassis. Up to eight modules in the BlackDiamond X8 chassis support up to 192 wirespeed 40GbE or 768 wirespeed 10GbE ports and only work with 5.12Tbps Fabric Module.	900855-10
	BDXA-40G12X	12-Port 40GBASE-X QSFP+ module for BlackDiamond X series chassis. Up to eight modules in the BlackDiamond X8 chassis support up to 96 wirespeed 40GbE or 384 wirespeed 10GbE ports and work with either 2.56 or 5.12Tbps Fabric Modules.	900856-10
	BDXA-10G48T	48-Port 10GBASE-T RJ45 module for BlackDiamond X series chassis. Up to eight modules in the BlackDiamond X8 chassis support up to 384 wirespeed 10GbE copper ports and work with either 2.56 or 5.12Tbps Fabric Modules.	908016-10

Understanding Management Modules

The switch has two dedicated management module slots, labeled A and B, for the BDX-MM1 management module. One management module is required for switch operation; however, adding a second management module increases system reliablility through redundancy. Each management module contains a temperature sensor, nonvolatile random-access memory (NVRAM), and a real-time clock.

The management module has very high speed and scalable control plane support with an Intel i7 dual core CPU which will run at 2 GHz, 1 GB compact flash and 2 GB ECC DDR3 SDRAM.

The following sections describe the functions and features of the BlackDiamond X8 management modules:

- Understanding Redundant Management Module Activity on page 14
- Features of the Management Module on page 14
- Reading Management Module LEDs on page 15

Understanding Redundant Management Module Activity

The switch can operate with a single management module installed or with two management modules installed for redundancy.

When you install a second management module, one of the management modules operates as the primary, and the other becomes the secondary or backup. The management modules are solely responsible for upper-layer protocol processing and system management functions and do not carry data plane traffic between I/O slots.

When you save the switch configuration, it is saved to all installed management modules.

Selection of the primary management module occurs automatically. The following examples describe the selection process:

- When a switch boots with two management modules installed, the management module in slot A becomes the primary.

  If a switch is operating with one management module and a second management module is added to the switch after it has been powered up, the added management module becomes the secondary. Management modules operating in secondary, or backup, mode can be inserted and removed without disrupting network services.
- If you remove the primary management module while the switch is operating, the secondary management module becomes the primary management module.

  For example, if you have a switch with a primary management module in slot A and a secondary management module in slot B, and you remove the primary management module from slot A, the secondary, or backup, management module in slot B becomes the primary.

Features of the Management Module

Management modules have the following features on the front panel:

- Management1 port : The 10/100/1000BASE-T Ethernet management port allows you to connect an Ethernet cable directly from your laptop to the management port to view and locally manage the switch configurations. This port can also be used to connect the system to a parallel management network for administration.
- Two USB ports: These ports allow you to attach a single external USB 2.0 flash drive for downloading new software or rescuing an image. Only one of these ports can be used at any one time. Only a USB flash drive that is formatted using the file allocation table (FAT) file system is recognized on this port. Other devices, such as a USB external hard drive, will not be mounted.

- Console port : The RJ-45 serial console port is used to connect a terminal, allowing you to perform local management.
- Auxiliary (AUX) port: For future development.

Management modules have the following LEDs (see Reading Management Module LEDs on page 15 for a description of the LEDs and their meanings):

- Presence of system errors (ERR)
- System environmental status (ENV)
- Master/backup status of the module (MSTR)
- General system status (SYS)
- General fan status (FAN)
- Fabric module status (FM)

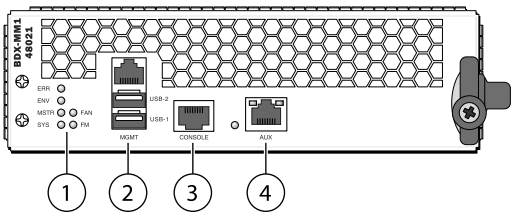

Figure 3: BDX-MM1 Module

1 = LEDs	3 = Console port
2 = Management port and USB ports	4 = Auxiliary port with LED

Reading Management Module LEDs

LEDs on the management module provide status information about operation of the switch and major chassis components.

Table 4: LEDs on the BDX-MM1 Management Module

Label/Function	Color/State	Meaning
ERR Error	Amber/steady	A critical software error has been logged since power-up.
	Off	Normal operation is occurring.
ENV Environmental status	Green/steady	The system is operating within the defined operational limits.
	Amber/steady	The system is operating outside the defined operational limits.
MSTR Master/backup status of module	Green/steady	This management module is the master in the system.
	Green/blinking	Power-on self-test (POST) is running.
	Amber/steady	Module is operating as backup (secondary) MM.
	Off	Normal operation for diagnostics.

Table 4: LEDs on the BDX-MM1 Management Module (continued)

Label/Function	Color/State	Meaning
SYS System status	Green/blinking	The system has booted and is operating normally.
	Amber/blinking	Diagnostic tests are running on the module. The LED resets if the diagnostics are terminated. The LED returns to flashing amber if another diagnostic test is started.
	Amber/steady	Diagnostic failure has occurred.
	Off	The switch is not receiving power.
FAN General fan status	Amber/steady	A fan failure has occurred. Check the Fan LEDS on the fan trays at the rear of the chassis. (See Table 7: LEDs for the Fan Trays on page 23.)
	Off	Fans are operating normally.
FM Fabric module status	Amber/steady	The fabric module is running diagnostics or has a fault condition. Check the FM LEDs on the fan trays at the rear of the chassis. (See Table 6: LEDs for the BlackDiamond X8 Series Fabric Modules on page 22.)
	Off	All the fabric modules are operating normally.
Link (on Management port)	Green	Link is up.
	Off	Link is down.
Activity (on Management port)	Amber	Packet activity is occurring.
	Off	No packet activity is occurring.
Auxiliary port (unlabeled)	N/A	For future development.

Understanding I/O Modules

The switch has the following I/O modules available:

- BDXA-10G48X
- BDXA-40G24X
- BDXA-40G12X
- BDXA-10G48T

No configuration information is stored on the I/O modules; all configuration information is stored on the management modules.

When a switch is powered on, the software generates a default configuration for any slots that contain I/O modules. The default configuration allows the I/O module ports to participate in the VLAN named default. The default configuration for the I/O module is not preserved unless you explicitly save the configuration to NVRAM.

You can configure parameters of an I/O module after it is installed, or preconfigure a slot for a certain type of module and configuration. The preconfigured information is applied to the module after it is inserted.

Caution
If you preconfigure the I/O module type for a slot and then insert a different type of I/O module into that slot, EXOS will detect a mismatch and will not power on the module or generate any kind of default configuration.

See the *ExtremeXOS Concepts Guide* and the *ExtremeXOS Command Reference Guide* for feature-specific information related to BlackDiamond X8 series modules.

BDXA-10G48X I/O Module

The BDXA-10G48X I/O module supports 48 SFP+-based 10-gigabit Ethernet ports.

Note
BlackDiamond X8 I/O modules are supplied with no pre-installed optical modules.

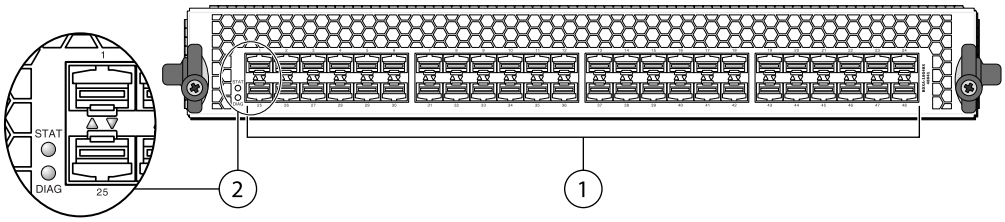

Figure 4: BDXA-10G48X I/O Module

1 = 10-Gigabit Ethernet ports	2 = LEDs

In the default configuration for the BDXA-10G48X module, all ports:

- Are added to the default VLAN as untagged.
- Inherit the properties of the default VLAN (for example, protocol type and VLAN ID).

The BDXA-10G48X module has the following LEDs:

- Module status (STAT)
- Module diagnostics (DIAG)
- Port status

For information about the LEDs and their activity on the BDXA-10G48X modules, see I/O Module LEDs on page 20.

BDXA-40G24X I/O Module

The BDXA-40G24X I/O module supports 24 QSFP+-based 40-gigabit Ethernet ports. Each QSFP+ port can operate as a single 40-gigabit port or as four 10-gigabit ports. In 40G port mode, the module provides 24 ports; if all ports are operating in 10G mode, the module provides 96 ports.

Note
BlackDiamond X8 I/O modules are supplied with no pre-installed optical modules.

When the ports are operating in 40-Gbps mode, the port numbers increment by 4. For example, the first four ports in the top row would be numbered (from left to right) 1, 5, 9, and 13. Other port numbers are displayed in ExtremeXOS as "not available." When a port is configured to operate in 10-Gbps mode, all four port numbers associated with that physical port are displayed as being available. The default mode for the ports is 40-Gbps operation.

When a port is configured to operate in 10-Gbps mode, all four port numbers associated with that physical port are displayed as being available. To configure a port for 10-Gbps operation, use the following command:

```
configure ports partition
```

Figure 5: BDXA-40G24X I/O Module on page 18shows the front of the module, including port and LED locations.

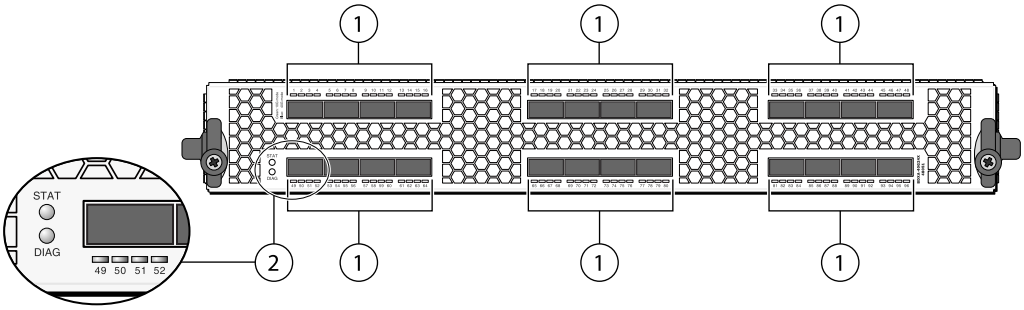

Figure 5: BDXA-40G24X I/O Module

1 = QSFP+ ports	2 = LEDs

In the default configuration for the BDXA-40G24X module, all ports:

- Are added to the default VLAN as untagged.
- Inherit the properties of the default VLAN (for example, protocol type and VLAN ID).

The BDXA-40G24X module has the following LEDs:

- Module status (STAT)
- Module diagnostics (DIAG)
- Port status

When a port is operating in 40-Gbps mode, the farthest left LED below that port lights blue to indicate the 40-Gbps operation. When a port is operating in 10-Gbps mode, each LED for an active channel from the port lights green.

For information about the LEDs and their activity on the BDXA-40G24X modules, see I/O Module LEDs on page 20.

Note

The BDXA-40G24X module requires BDX-FM20T fabric modules in order to function. The module will not work with BDX-FM10T.

BDXA-40G12X I/O Module

The BDXA-40G12X I/O module supports 12 QSFP+-based 40-gigabit Ethernet ports. Each QSFP+ port can operate as a single 40-gigabit port or as four 10-gigabit ports. In 40G port mode, the module provides 12 ports; if all ports are operating in 10G mode, the module provides 48 ports.

Note

BlackDiamond X8 I/O modules are supplied with no pre-installed optical modules.

When the ports are operating in 40-Gbps mode, the port numbers increment by 4. For example, the first four ports would be numbered (from left to right) 1, 5, 9, and 13. Other port numbers are displayed in ExtremeXOS as “not available.”

When a port is configured to operate in 10-Gbps mode, all four port numbers associated with that physical port are displayed as being available. The default mode for the ports is 40-Gbps operation. To configure a port for 10-Gbps operation, use the command:

```
configure ports partition
```

Figure 6: BDXA-40G12X I/O Module on page 19 shows the front of the module, including port and LED locations.

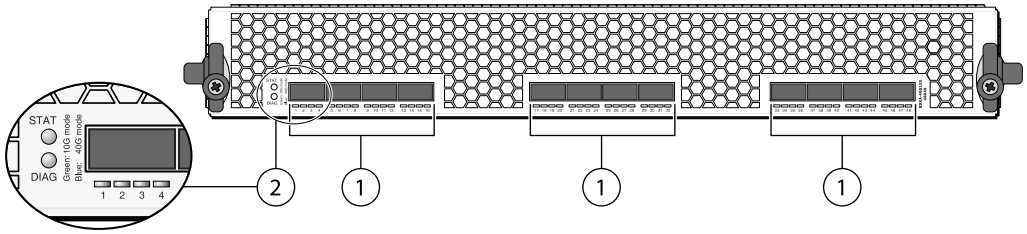

Figure 6: BDXA-40G12X I/O Module

1 = QSFP+ ports	2 = LEDs

In the default configuration for the BDXA-40G12X module, all ports:

- Are added to the default VLAN as untagged.
- Inherit the properties of the default VLAN (for example, protocol type and VLAN ID).

The BDXA-40G12X module has the following LEDs:

- Module status (STAT)
- Module diagnostics (DIAG)
- Port status

When a port is operating in 40-Gbps mode, the farthest left LED below that port lights blue to indicate the 40-Gbps operation. When a port is operating in 10-Gbps mode, each LED for an active channel from the port lights green.

For information about the LEDs and their activity on the BDXA-40G12X modules, see I/O Module LEDs on page 20.

BDXA-10G48T I/O Module

The BDXA-10G48T I/O module has 48 copper 10-gigabit Ethernet ports.

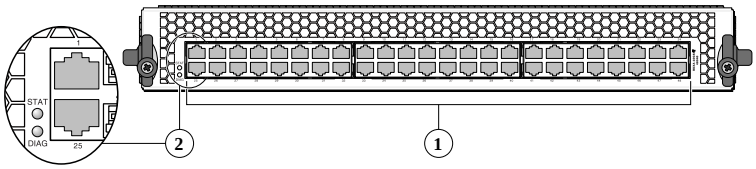

Figure 7: BDXA-10G48T I/O Module

1 = 10-gigabit Ethernet ports	2 = LEDs

In the default configuration for the BDXA-10G48T module, all ports:

- Are added to the default VLAN as untagged.
- Inherit the properties of the default VLAN (for example, protocol type and VLAN ID).

The BDXA-10G48T module has the following LEDs:

- Module status (STAT)
- Module diagnostics (DIAG)
- Port status

For information about the LEDs and their activity on the BDXA-10G48T modules, see I/O Module LEDs on page 20.

I/O Module LEDs

LEDs on the front panel of the BlackDiamond X8 series I/O modules provide information about the operating status of the module and ports.

Table 5: LEDs on the BlackDiamond X8 Series I/O Modules

Type	Label/Function	Color/State	Meaning
Module	STAT Module status	Green/blinking	Normal operation.
		Amber/blinking	Configuration error, code version error, diagnostic failure, or other severe module error.
		Off	The module is not receiving power.
	DIAG Module diagnostics	Amber/blinking	Diagnostic tests are in progress.
		Amber/steady	A diagnostic failure has occurred.
		Off	Normal operation.
Port	Port status	Green/steady	Link is up.
		Green/blinking	Port is disabled.
		Amber blinking	Packet activity on port.
		Off	Link is down.

Understanding Fabric Modules

Up to four fabric modules can be installed in each BlackDiamond X8 chassis to provide the active switching fabric for the switch. The switch fabric supports N+1 redundancy. Three fabric modules are required to provide full switch fabric capacity. The fourth module provides excess capacity for redundancy but is not required to maintain full line rate on the front-panel ports. Fabric modules are installed in dedicated slots at the back of the chassis, behind the fan trays.

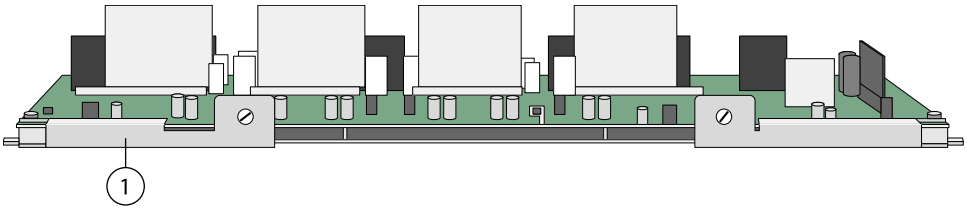

Figure 8: Fabric Module

1 = Inserter/extractor lever

Two types of fabric modules are available for the switch:

- BDXA-FM10T module
- BDXA-FM20T module

BDXA-FM10T fabric modules provide a total switch fabric capacity of 10 Terabits per second, and BDXA-FM20T fabric modules provide 20 Terabits per second.

A switch fabric composed of BDXA-FM10T modules will provide full line rate for the BDXA-10G48X, BDXA-10G48T, and BDXA-40G12X I/O modules. For the BDXA-40G24X I/O module, a BDXA-FM20T switch fabric is required for full line rate on all ports. The BDXA-40G24X I/O module will not operate with a switch fabric composed of BDXA-FM10T modules.

All the fabric modules in a switch must be the same type; you cannot combine BDXA-FM10T modules and BDXA-FM20T modules.

Status LEDs for each fabric module are on the fan tray that is in front of that fabric module. The status LEDs for the fabric module are labeled Diag and Stat.

The following table describes the meanings of the fabric module LEDs.

Table 6: LEDs for the BlackDiamond X8 Series Fabric Modules

Label/Function	Color/State	Meaning
DIAG Module diagnostics	Amber/blinking	Diagnostic tests are in progress.
	Amber/steady	A diagnostic failure has occurred.
	Off	Normal operation
STAT Module status	Green/blinking	Normal operation
	Amber/blinking	Configuration error, code version error, or other severe module error.
	Amber/steady	The module is present but not receiving power.
	Off	The module is not present.

Understanding Fan Trays

At the back of the BlackDiamond X8 chassis are five vertical fan trays, each holding six fans. Fan trays are hot-swappable. Two pairs of LEDs on each fan tray indicate operating status for the fabric module installed behind that fan tray. Only the first four fan trays (starting from the left most side when looking at the rear of the chassis) are associated with fabric modules.

Caution

Never lift the chassis by using the handles on the fan trays.

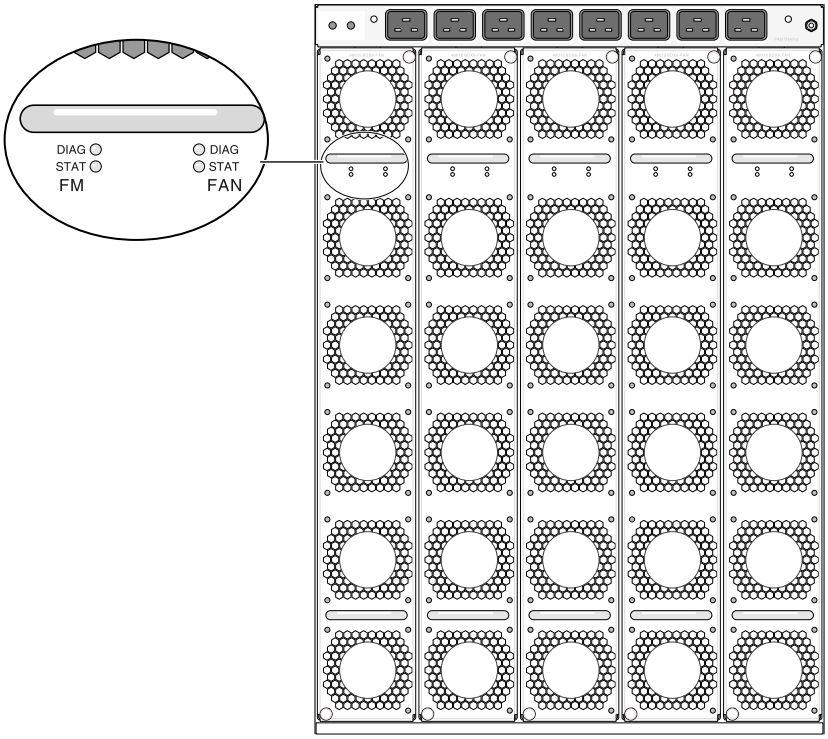

Figure 9: Fan Trays in the BlackDiamond X8 Chassis

Table 7: LEDs for the Fan Trays

Label/Function	Color/State	Meaning
Stat	Green	Fans are operating normally.
	Amber/blinking	One or more fans are not operating properly.
	Off	No power.
Diag	Amber/steady	Controller is not functioning properly.
	Amber/blinking	Firmware upgrade is in progress.
	Off	Normal operation.

3 Understanding Power Supplies

Understanding PSU Redundancy in the BlackDiamond X8 Chassis
AC Power Supply

The BlackDiamond X8 is powered by AC power supplies that are installed at the top front of the chassis.

Warning

Field operators must not attempt to open the power supply enclosure for any reason; the power supply does not contain user-serviceable parts. In the event of failure, return the defective power supply to Extreme Networks for repair or replacement.

The power supply bay in the switch can accommodate up to eight AC power supplies.

Note

AC power supplies are ordered separately from the BlackDiamond X8 chassis.

The AC power supplies can operate from 110 VAC or 220 VAC and automatically adjust to the supply voltage. With 220 VAC input, the AC power supplies can operate in an N+N or N+1 configuration. Depending upon the load, with 110 VAC input the AC power supplies can operate in an N+N or N+1 configuration as well.

Power supplies in the BlackDiamond X8 are fully fault tolerant and load-sharing in an N+1 configuration. After the system is properly configured, if one power supply fails, the others provide sufficient power to operate a fully loaded switch.

For more information on redundancy in the BlackDiamond X8 chassis, see Understanding PSU Redundancy in the BlackDiamond X8 Chassis on page 24

Understanding PSU Redundancy in the BlackDiamond X8 Chassis

This section describes how N+1 and N+N redundancy apply to the BlackDiamond X8 PSUs (power supply units). Extreme Networks sales personnel know exactly how much power should be allocated for each module in a customer's system and the maximum power output each PSU can deliver. Extreme Networks sales personnel will determine how many PSUs are needed for each installation to achieve the desired redundancy.

This section contains the following topics:

- Power System Redundancy Overview on page 25
- N+1 Redundancy on page 25
- N+N Redundancy on page 25
- Simultaneous N+1 and N+N Redundancy on page 25

Power System Redundancy Overview

The BlackDiamond X8 chassis has slots for eight PSUs. There is a power connector on the back for each PSU. If all populated PSUs are powered from 220VAC, then each PSU is capable of supplying about 2500W to the chassis. If any PSU is powered by 120VAC, then each PSU is capable of supplying about 1250W.

Note

2500W and 1250W are approximations. When several PSUs are installed in a system, the actual power per PSU decreases by up to 10%. This decrease is taken into account when a system is configured.

N+1 Redundancy

To guarantee that the BlackDiamond X8 will operate properly in the event of a single PSU failure, the user must calculate how many PSUs are required to power all the modules and fan trays in the configuration.

Do the following to calculate the number of PSUs required for N+1 redundancy:

1. Add up the power consumptions of all the MMs, IOBs, FMs, and Fan Trays in the system.
2. Divide the total power consumption by either 2500 or 1250 (depending on line voltage), and round the result up to the next whole integer (this number is 'N').
3. Add 1 to N to get the total number of PSUs required for N+1 Redundancy.

If more modules are added to the chassis, more PSUs may be needed to maintain N+1 Redundancy. N+1 Redundancy is possible with any existing chassis configuration, even if the line voltage is 120VAC.

N+N Redundancy

N+N refers to power source redundancy. For instance, a data center may have two independent power sources available so that if one source fails, the other source (backup) will automatically take over and power the BlackDiamond X8 chassis.

To achieve N+N redundancy, the top row of PSUs (Bank A) should be powered from the same facility power source, (that is, plugged into power circuits derived from a single power source). The bottom row of PSUs (Bank B) should be powered from the backup power source. The user needs to install enough PSUs in each bank to power the entire BlackDiamond X8 chassis. If the line voltage is 220VAC, then there should be no problem powering the entire chassis with four PSUs. If the line voltage is 120VAC, most configurations can be powered by four PSUs.

Simultaneous N+1 and N+N Redundancy

To achieve both N+1 and N+N redundancy at the same time, three (or fewer) PSUs must be capable of powering the entire BlackDiamond X8 chassis. Each bank of PSUs should be populated with enough PSUs to power the chassis (N) plus one more chassis (N+1).

AC Power Supply

The AC power supply for the BlackDiamond X8 delivers 2500 W when operated from 185 to 264 VAC, or 1250 W when operated from 90 to 140 VAC.

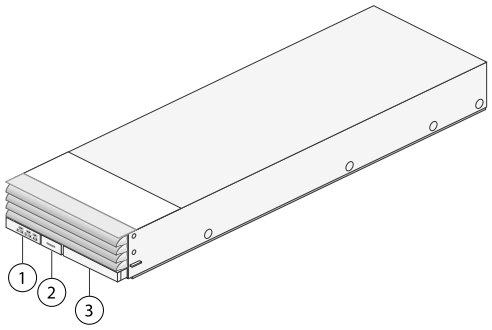

Figure 10: BlackDiamond X8 AC Power supply

1 = LEDs	3 = Inserter/extractor lever
2 = Release button	

Each AC PSU contains two cooling fans at the front of the unit. Airflow is from front to back.

The BlackDiamond X8 AC power supply does not contain a field-operator-replaceable fuse.

Warning

Field operators must not attempt to configure or replace fuses in Extreme Networks AC power supplies. In the event of failure, immediately return the defective Extreme Networks AC power supply for a complete replacement.

For information about installing the BlackDiamond X8 AC PSU, see Installing Power Supplies on page 49.

For more information on PSU redundancy, see Understanding PSU Redundancy in the BlackDiamond X8 Chassis on page 24.

Reading AC Power Supply LEDs

The BlackDiamond X8 AC power supply has status LEDs on the front panel. The following table describes the meanings of the power supply LEDs:

Table 8: LEDs on the BlackDiamond X8 AC Power Supply

	LED Type and Color		
Power Supply Condition	AC OKGreen	DC OKGreen	ALMRed
No AC input power to any power supply. (Receiving standby output from backplane)	Off	Off	Off
AC input power is present. 48 V output is disabled. Standby output is ON.	On	Off	Off
AC input is present; DC outputs are good.	On	On	Off
AC input is good; output (48 V) has a fault.	On	Off	On
Output is good, but a warning alarm has been detected (for example, Undervoltage).	On	On	On

Understanding Power Supply Cords

An AC power cord is not included with the BlackDiamond X8 AC power supply.

You can purchase AC power cords for use in the US and Canada from Extreme Networks or from your local supplier. An AC power cord for use with the BlackDiamond X8 AC power supply must meet the requirements listed in Power Cord Requirements on page 115.

4 Preparing Your Site

Planning Your Site
Meeting Site Requirements
Evaluating and Meeting Cable Requirements
Meeting Power Requirements
Following Applicable Industry Standards

The information in this section is intended for the system administrator, network equipment technician, network manager, or facilities manager responsible for installing and managing the network hardware.

This section assumes a working knowledge of local area network (LAN) operations, familiarity with communications protocols that are used on interconnected LANs, and familiarity with basic installation procedures for networking equipment.

Note

Before installing or removing any components of the system, or before carrying out any maintenance procedures, read the safety information in BlackDiamond X8 Series Switches of this guide.

Planning Your Site

By carefully planning your site, you can maximize the performance of your existing network and ensure that it is ready to migrate to future networking technologies. The site planning process has three major parts.

1 Meet site requirements.

The physical installation site must meet the following requirements for a safe and successful installation:

- Building and electrical code requirements,
- Environmental, safety, and thermal requirements for the equipment you plan to install.
- Equipment rack requirements.

2 Evaluate and meet cable requirements.

Evaluate and compare your existing cable plant with the requirements of the Extreme Networks equipment to determine if you need to install new cables.

3 Meet power requirements.

To run your equipment safely, you must meet the specific power requirements for each component and external power supply unit installed in each system. For BlackDiamond X8 power supply specifications, see Power Supplies for BlackDiamond X8 Switches on page 115.

Meeting Site Requirements

The following sections describe the requirements for your operating environment, cables, and power.

Meeting Operating Environment Requirements

Learn the regulations for building codes and standards.

Virtually all areas of the United States are regulated by building codes and standards. During the early planning stages of installing or modifying your network, it is important that you develop a thorough understanding of the regulations that pertain to your location and industry.Verify that your site meets all environmental and safety requirements.

Complying with Building and Electrical Codes

Building and electrical codes vary depending on your location.

You must comply with all code specifications when planning your site and installing cable. This section lists resources for obtaining additional information.

For information about major building codes, consult the following organization:

- International Code Council (ICC), 5203 Leesburg Pike, Falls Church, Virginia 22041 USA.
  - http://www.iccsafe.org
  - http://www.sbcci.org

Table 9: Authorities on Electrical Codes

Organization	Address	Web Site URL
National Electrical Code (NEC) Classification (USA only) Recognized authority on safe electrical wiring. Federal, state, and local governments use NEC standards to establish their own laws, ordinances, and codes on wiring specifications. The NEC classification is published by the National Fire Protection Association (NFPA).	NFPA 1 Batterymarch Park Quincy, Massachusetts 02169 USA	http://www.nfpa.org
Underwriters' Laboratory (UL) (USA only) Independent research and testing laboratory. UL evaluates the performance and capability of electrical wiring and equipment to determine whether they meet certain safety standards when properly used. Acceptance is usually indicated by the words "UL Approved" or "UL Listed."	UL 333 Pfingsten Road Northbrook, Illinois 60062-2096 USA	http://www.ul.com
National Electrical Manufacturing Association (NEMA) (USA only) Organization of electrical product manufacturers. Members develop consensus standards for cables, wiring, and electrical components.	NEMA 1300 N. 17th Street Rosslyn, Virginia 22209 USA	http:// www.nema.org
Electronics Industries Alliance (EIA) Trade association that develops technical standards, disseminates marketing data, and maintains contact with government agencies in matters relating to the electronics industry.	EIA 2500 Wilson Boulevard Arlington, Virginia 22201 USA	http://www.eia.org
Federal Communications Commission (FCC) (USA only) Commission that regulates all interstate and foreign electrical communication systems that originate in the United States according to the Communications Act of 1934. The FCC regulates all U.S. telephone and cable systems.	FCC 445 12th Street S.W. Washington, D.C. 20554 USA	http://www.fcc.gov

Checking Equipment Location

Recommendations for your equipment location.

Note

We recommend that you consult an electrical contractor for commercial building and wiring specifications.

1. Be sure that your system is readily accessible for installation and service.
   See Rack Specifications and Recommendations on page 31 for information.
2. Use appropriate AC or DC power, power distribution, and grounding for your specific installation.
3. Use a vinyl floor covering in wiring closets or other indoor equipment locations.
   Concrete floors accumulate dust, and carpets can cause static electricity.
4. Prevent unauthorized access to equipment locations by providing door locks.
   Install the equipment in a secured, enclosed, and restricted access location, ensuring that only qualified service personnel have access to the equipment.
5. Provide adequate overhead lighting for easy maintenance.
6. Be sure that each equipment location has a suitable ground.
   All equipment racks and equipment installed in the closet should be grounded.
7. Be sure that all system environmental requirements are met, such as ambient temperature and humidity.

Controlling Temperature

It is important to keep installed equipment within the thermal operating specifications for optimum performance and safety.

Install the equipment only in a temperature- and humidity-controlled indoor area that is free of airborne materials. Too much humidity can cause a fire. Too little humidity can produce electrical shock and fire.

Note

As with all electrical equipment, Extreme Networks product lifetimes degrade with increased temperature. If possible, temperatures should be kept at approximately 78° F (25° C) or lower.

1. Be sure that the ventilation in the wiring closet is adequate to maintain a temperature below 104° F (40° C).
2. Install a reliable air conditioning and ventilation system.
3. Keep the ventilation in the wiring closet running during non-business hours; otherwise, the equipment can overheat.
4. Maintain an ambient operating temperature of 32° to 104° F (0° to 40° C).
5. Maintain a storage temperature of -40° to 158° F (-40° to 70° C).

Controlling Humidity

Maximize equipment life by keeping relative humidity between allowable limits.Keep operating humidity between 50% and 70% relative humidity (non-condensing) during typical operation.

Following Spacing and Airflow Requirements

Be sure that walls and other equipment do not block the air intake or outflow on an Extreme Networks switch.

1 Leave a minimum of 24 inches (61 cm) between any solid wall or other obstruction and the front and back of the chassis.
2 Measure the air temperature approximately 1 inch (2.5 cm) from the front of I/O slot 1. The temperature should be less than 104 °F (40 °C).

Protecting from Electrostatic Discharge

Your system must be protected from static electricity or electrostatic discharge (ESD).

1 Remove materials that can cause electrostatic generation (such as synthetic resins) from the equipment location. Check the appropriateness of floor mats and flooring.
2 Connect metal chassis, conduit, and other metals to ground using dedicated copper grounding lines.
3 Use electrostatically safe equipment.
   a If you are working with pluggable interface modules, wear an ESD-preventive device such as a wrist strap, and connect the metal end to a grounded equipment rack or other source of ground.

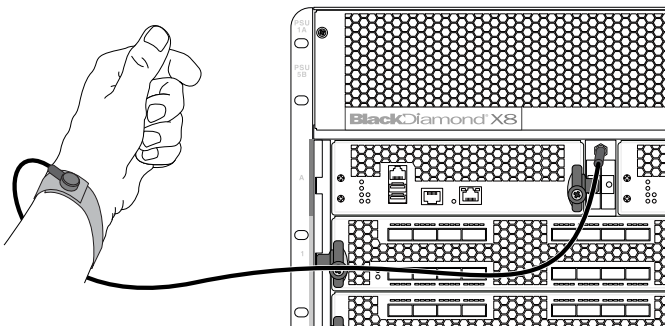

Figure 11: Using an ESD-preventive Wrist Strap

Rack Specifications and Recommendations

Racks should conform to conventional standards. In the United States, use EIA Standard RS-310C: Racks, Panels, and Associated Equipment.

In countries other than the United States, use IEC Standard 297. In addition, verify that your rack meets the basic mechanical, space, and earthquake requirements that are described in this section.

Mechanical Recommendations for the Rack

Use equipment racks that meet the following mechanical recommendations:

- Use an open style, 19-inch rack to facilitate easy maintenance and to provide proper ventilation.
- Use a rack made of steel or aluminum.
- Use the universal mounting rail hole pattern that is identified in IEC Standard 297.
- Ensure the rack has designated earth grounding connections (typically on the base).

- Ensure the rack must meet earthquake safety requirements equal to that of the installed chassis.
- Ensure the mounting holes are flush with the rails to accommodate the chassis.
- Ensure the rack supports approximately 1260 pounds (572 kg).

Using Protective Grounding for the Rack

Use a rack grounding kit and a ground conductor that is carried back to earth or to another suitable building ground.

All Extreme Networks switches are designed with mounting brackets that provide solid metal-to-metal connection to the rack. If you do not use equipment racks, you can attach wiring terminals directly to the mounting brackets for appropriate grounding. Extreme Networks switches have grounding terminals that are mounted on the back of the chassis.

Note

Because building codes vary worldwide, We strongly recommend that you consult an electrical contractor to ensure proper equipment grounding for your specific installation.

At a minimum, follow these guidelines to ground equipment racks to the earth ground:

1 CAD weld appropriate wire terminals to building I-beams or earth ground rods.
2 Use the appropriate chassis grounding wire for your system; the correct size depends on the available input current to the power supply. For AC systems using a 20A breaker per PSU, the chassis ground can be as small as 14 AWG. The power cable ground should be the same size as the primary.

Note

For complete details on power supplies and power supply cords, refer to Power Supplies and to Selecting Power Supply Cords on page 101. Drill and tap wire terminals to equipment racks.

3 Position the earth ground as close to the equipment rack as possible to maintain the shortest wiring distance possible.
4 Use a ground impedance tester or micro-ohm meter to test the quality of earth ground connection at the chassis. This will ensure good grounding between the chassis, rack, and earth ground.

Meeting Space Requirements for the Rack

The rack must have enough space around it for servicing.

Provide enough space in front of and behind the switch so that you can service it easily.

a Allow a minimum of 48 inches (122 cm) in front of the rack and 24 inches (61 cm) behind the rack.
b When using a relay (two-post) rack, provide a minimum of 24 inches (61 cm) of space behind the mounted equipment.
c Extra room on each side is optional.

Securing the Rack

1 Attach the rack to the floor with 3/8-inch (9.5 mm) lag screws or equivalent hardware.

The floor under the rack should be level within 3/16-inch (5 mm). Use a floor-leveling cement compound if necessary or bolt the racks to the floor as shown in Figure 12: Properly Secured Rack on page 33.

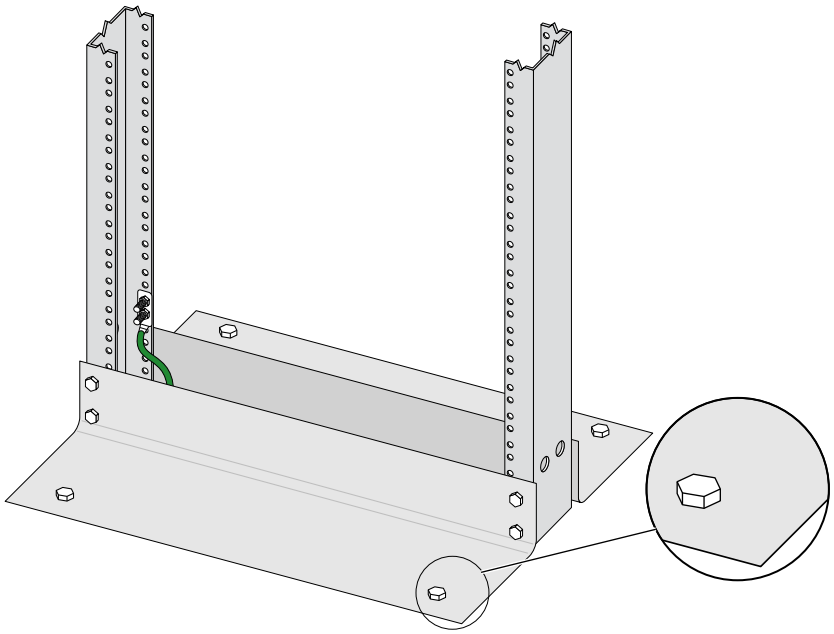

Figure 12: Properly Secured Rack

2 Brace open equipment racks if the channel thickness is less than 1/4 inch (6.4 mm).

Evaluating and Meeting Cable Requirements

The following sections describe the cable requirements.

Cabling Standards

Use professional consultants for site planning and cabling.We recommend using the Building Industry Consulting Service International (BICSI) Registered Communications Distribution Designer (RCDD), which is globally recognized as a standard in site planning and cabling. For information, go to www.bicsi.org.

Labelling Cables

A reliable cable labeling system is essential when planning and installing a network.

Maintaining accurate records helps you to:

- Relocate devices easily.
- Make changes quickly.
- Isolate faults in the distribution system.

- Locate the opposite end of any cable.
- Know the types of network devices that your cabling infrastructure can support.

Do the following to properly label your cables:

1 Identify cables by securely attaching labels to all cable ends.
2 Assign a unique block of sequential numbers to the group of cables that run between each pair of equipment locations.
3 Assign a unique identification number to each equipment rack.
4 Identify all equipment locations by labeling the front panel of your Extreme Networks equipment and other hardware.
5 Keep accurate and current cable identification records.
6 Post records near each equipment rack.

   For each cable drop, include information about the cable source, destination, and jumper location.

Determining Cable Distances

Building and electrical codes vary depending on your location. The following tables show cable media types and maximum distances that support reliable transmission in accordance with international standards, except where noted.

Table 12: Extreme Networks Direct-Attach Cables on page 35 lists the Extreme Networks direct-attach cables.

Table 10: Fiber Media Types and Maximum Cable Distances

Standard	Media Type	Mhz•Km Rating	Maximum Distance
1000BASE-SX (850 nm optical window)	50/125 µm multimode fiber	400	500 meters
	50/125 µm multimode fiber	500	550 meters
	62.5/125 µm multimode fiber	160	220 meters
	62.5/125 µm multimode fiber	200	275 meters
1000BASE-LX (1300 nm optical window)	50/125 µm multimode fiber	400	550 meters
	50/125 µm multimode fiber	500	550 meters
	62.5/125 µm multimode fiber	500	550 meters
	10/125 µm single-mode fiber	–	5 km
	10/125 µm single-mode fiber[1]	–	10 km meters
1000BASE-ZX (1550 nm optical window)	10/125 µm single-mode fiber	–	80 km
100BASE-LX100 (1550 nm optical window)	10/125 µm single-mode fiber	–	100 km

[1] Proprietary to Extreme Networks. Connections between two Extreme Networks 1000BASE-LX interfaces that use 10/125 µm single-mode fiber can use a maximum distance of 10 km.

Table 10: Fiber Media Types and Maximum Cable Distances (continued)

Standard	Media Type	Mhz•Km Rating	Maximum Distance
1000BASE-BX10 (1490 nm optical window) (1310 nm optical window)	10/125 µm single-mode fiber	–	10 km
1000BASE-LX70 (1550 nm optical window)	10/125 µm single-mode fiber	–	70 km
10GBASE-SR SFP+ (850 nm optical window)	62.5 mm multimode fiber	160	26 meters
	62.5 mm multimode fiber (OM1)	200	33 meters
	50 mm multimode fiber	400	66 meters
	50 mm multimode fiber (OM2)	500	82 meters
	50 mm multimode fiber (OM3)	2000	300 meters
10GBASE-LR SFP+ (1310 nm optical window)	10/125 µm single-mode fiber	–	10 km
10GBASE-ER SFP+ (1550 nm optical window)	10/125 µm single-mode fiber	–	40 km
40GBASE-LR4 QSFP+ (1310 nm optical window)	singlemode fibre		10 km
40GBASE-SR4 QSFP+ (850 nm optical window)	50 mm multimode fiber (OM3)	–	100 meters
	50 mm multimode fiber (OM4)		150 meters

Table 11: Copper Cable Category, Transmission Rate, and Maximum Cable Distances

Cable Category	Distance for 100 Mb/s	Distance for 1Gb/s	Distance for 10Gb/s
5	100 meters	--	--
5e	100 meters	100 meters	--
6	100 meters	100 meters	55 meters
6 unscreened	100 meters	100 meters	55 meters
6 screened	100 meters	100 meters	100 meters
6a	100 meters	100 meters	100 meters
7	100 meters	100 meters	100 meters

Table 12: Extreme Networks Direct-Attach Cables

Cable Type	Model Number	Length
SFP+ passive copper cable	10304	1 meter
	10305	3 meters
	10306	5 meters
	10307	10 meters

Table 12: Extreme Networks Direct-Attach Cables (continued)

Cable Type	Model Number	Length
QSFP+ passive copper cable	10311	0.5 meter
	10312	1 meter
	10313	3 meters
QSFP+ active optical cable	10315	10 meters
	10316	20 meters
	10318	100 meters
QSFP+-to-SFP+ fan-out passive copper cable	10321	3 meters
	10322	5 meters

Installing Cable

When you connect cable to your network equipment:

1 Examine cable for cuts, bends, and nicks.
2 Support cable using a cable manager that is mounted above connectors to avoid unnecessary weight on the cable bundles.
3 Use cable managers to route cable bundles to the left and right of the network equipment to maximize accessibility to the connectors.
4 Provide enough slack, approximately 2 to 3 inches (50 to 75 mm), to provide proper strain relief.
5 Bundle cable using hook-and-loop straps to avoid injuring cables.
6 If you build your own cable, be sure that connectors are properly crimped.
7 When installing a patch panel using twisted pair wiring, untwist no more than 0.25 inches (0.64 mm).of the cable to avoid radio frequency (RF) interference.
8 Discharge the RJ-45 Ethernet cable before plugging it into a port on the BlackDiamond X8.
9 Use plenum-rated cable when it is necessary for safety and fire rating requirements. Consult your local building codes to determine when it is appropriate to use plenum-rated cable, or refer to IEC standard 850.
10 Keep all ports and connectors free of dust.

Caution

Unshielded twisted pair (UTP) cable can build up ESD charges when being pulled into a new installation. Before connecting any cable to the switch, discharge ESD from the cable by plugging the RJ-45 connector into a LAN Static Discharge device or use an equivalent method.

Fiber Optic Cable

Fiber optic cable must be handled carefully during installation.

Every cable has a minimum bend radius, and fibers will be damaged if the cables are bent too sharply. It is also important not to stretch the cable during installation. We recommend that the bend radius for

fiber optic cable equal 2 inches (51 mm) minimum for each 90-degree turn as shown in Figure 13: Bend Radius for Fiber Optic Cable on page 37 .

Note

Kinks and sharp bends can destroy or impair the cable's ability to convey light pulses accurately from one end of the cable to the other. Use care in dressing the optical fiber cables: provide satisfactory strain relief to support the cable and maintain an adequate bend radius at all cable turns, particularly where the cable connects to the I/O module.

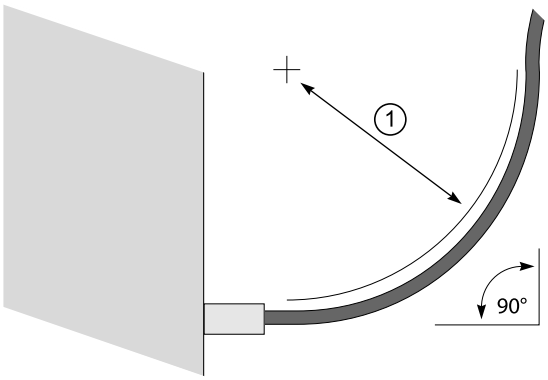

Figure 13: Bend Radius for Fiber Optic Cable

1 = Minimum 2-inch (51 mm) radius in 90° bend

Preventing Radio Frequency Interference

If you use UTP cabling in an installation, take precautions to avoid RF interference.

RF interference can cause degradation of signal quality, and, in an Ethernet network environment, can cause excessive collisions, loss of link status, or other physical layer problems that can lead to poor performance or loss of communication.

1 Avoid the following situations:
   a Attaching UTP cable to AC power cables
   b Routing UTP cable near antennas, such as a ham radio antenna
   c Routing UTP cable near equipment that could exhibit RF interference, such as ARC welding equipment
   d Routing UTP cable near electrical motors
   e Routing UTP cable near air conditioner units
   f Routing UTP cable near electrical transformers
2 In areas or applications where these situations cannot be avoided, use fiber optic cabling or shielded twisted pair cabling (STP).

Meeting Power Requirements

The following sections contain recommendations for planning your connections for your Extreme Networks equipment.

Planning Power Supply Requirements

Follow these recommendations when you are planning your connections for your Extreme Networks equipment.

1. Place the equipment in an area that accommodates the power consumption and component heat dissipation specifications.
2. Be sure that your power supply meets the site DC power or AC power requirements of the network equipment.
3. When you connect power to installed equipment, do not make this connection through an extension cord or power strip.
4. Connect half of the power supplies to one power source. Connect the others to a separate independent power source.

   If a power source fails, it will affect only the power supplies to which it is connected. If all BlackDiamond X8 power supplies are connected to a single power source, the entire chassis is vulnerable to a power source failure.
5. In regions that are susceptible to electrical storms, we recommend that the AC/commercial power should be conditioned and that appropriately sized/rated surge arrestor/suppression devices be installed/utilized.

For additional information on power supplies, see Power Supplies for BlackDiamond X8 Switches on page 115.

Turning off and on your unit

There is no power switch on the chassis.

Warning

For systems using an AC power supply, unplug the AC power cords from the back of the chassis to disconnect the power to the chassis.

AC Power Cord Requirements

AC power input cords are not included with BlackDiamond X8 power supplies. You can purchase AC power cords for use in the US and Canada from Extreme Networks or from your local supplier.

Make sure that the power cord you use is certified for the country of end use and suitable for the device. Check your local electrical codes and regulatory agencies for power cable requirements.

The power cord must meet the requirements listed in Selecting Power Supply Cords on page 101.

Note

Make sure that each AC PSU is supplied by independently fused power circuits.

Uninterruptible Power Supply Requirements

An uninterruptible power supply (UPS) is a device that sits between a power supply (such as a wall outlet) and a device (such as a switch) to prevent outages, sags, surges, and bad harmonics from adversely affecting the performance of the device.

A UPS traditionally can perform the following functions:

- Absorb relatively small power surges.
- Smooth out noisy power sources.
- Continue to provide power to equipment during line sags.
- Provide power for some time after a blackout has occurred.

In addition, some UPS or UPS plus software combinations provide the following functions:

- Automatically shut down equipment during long power outages.
- Monitor and log power supply status.
- Display the voltage (current draw) of the equipment.
- Restart equipment after a long power outage.
- Display the voltage currently on the line.
- Provide alarms on certain error conditions.
- Provide short circuit protection.

Selecting a UPS

Select a UPS that meets your requirements:

- What are the amperage requirements?
- What is the longest potential time period that the UPS would be required to supply backup power?
- Where will the UPS be installed?
- What is the maximum transition time that your installation will allow?

Note

We recommend that you use a UPS that provides online protection.

Calculating Volt-Amperage Requirements

Building and electrical codes vary depending on your location.

1. Multiply the number of PSUs by 2500W to get VA. If the BDX is to be operated from 110VAC, then multiply the number of PSUs by 1250W to get VA.

   VA = Volts multiplied by Amperes
2. Add 30% to the total (recommended by Extreme Networks) to determine the minimum volt-amperage requirements for your UPS.

UPS Transition Time

Transition time is the time that is necessary for the UPS to transfer from utility power to full-load battery power. For Extreme Networks products, a transition time of less than 20 milliseconds is required for optimum performance.

Following Applicable Industry Standards

Always follow applicable industry standards.

For more infor mation, see the following ANSI/TIA/EIA standards:

- ANSI/TIA/EIA-568-A: Discusses the six subsystems of a structured cabling system.
- ANSI/TIA/EIA-569-A: Discusses design considerations.
- ANSI/TIA/EIA-606: Discusses cabling system administration.
- ANSI/TIA/EIA-607: Discusses commercial building grounding and bonding requirements.

You can access these standards at www.ansi.org or www.tiaonline.org

5 Installing a BlackDiamond X8 Series Chassis

Unpacking the Chassis
Checking Pre-Installation Requirements
Rack-Mounting the Chassis
Grounding the Chassis
Installing Power Supplies
Connecting Power Cords

Before you install the BlackDiamond X8 Chassis, read the information in Safety Information on page 98. Installing the BlackDiamond X8 chassis requires two people to maneuver the switch and attach mounting hardware. Make sure there is adequate space behind the rack to provide access for installing power supplies, cables, and modules.

The chassis should be installed before the modules and module blanks are installed. The chassis is designed to fit into a standard 19-inch equipment rack. Optional mid-mount brackets allow you to install the chassis in a mid-mount position.

Unpacking the Chassis

Use this procedure to safely remove the chassis from the box.

Caution

An unpopulated BlackDiamond X8 chassis weighs approximately 152 pounds (69 kg) as shipped. Lifting the BlackDiamond X8 chassis safely requires a minimum of two people or appropriate lifting equipment.

Note

Save all packaging, bolts, and washers, as well as the box and pallet, for future use in the event that the chassis must be moved to another location or returned to Extreme Networks.

Refer to the illustrations printed on the BlackDiamond X8 shipping container and unpack the chassis and accessories.

1 Cut the straps around the box.

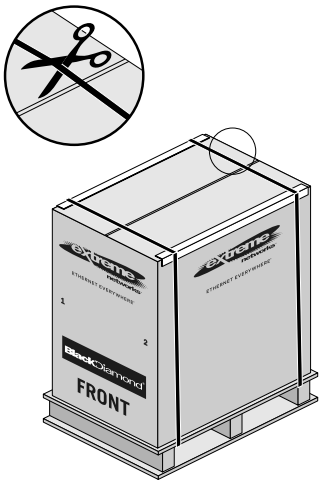

Figure 14: Unstrapping the Box

2 Slide the box up and off the chassis and interior packing foam.

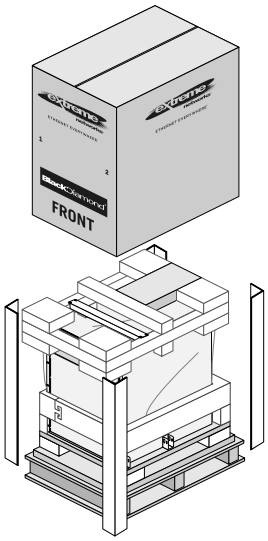

Figure 15: Removing the Box

3 Remove the inside corner braces.
4 Remove the support brackets and boxed accessories and set them aside until you need them.
5 Lift off the upper packing foam.

6 Pull apart the keyed corner of the lower packing foam and remove the lower packing foam from around the chassis.

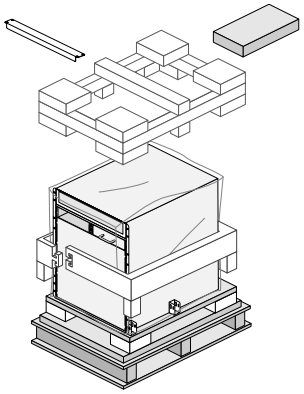

Figure 16: Removing the Accessories and Foam

7 On each side, remove the restraining bolts from the shipping brackets at the front and middle of the chassis.

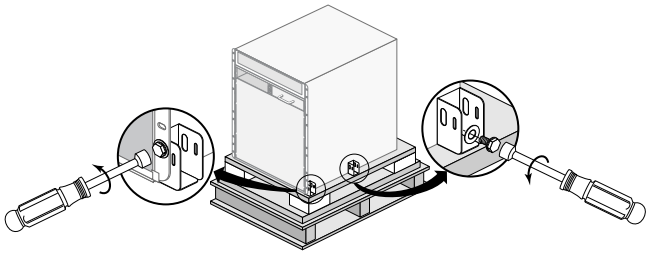

Figure 17: Unbolting the Chassis

8 Remove all the fan trays, one at a time.

a Completely loosen the retaining screws at the top and bottom of the fan tray.

b Holding both handles, pull straight outward on the fan tray to disconnect the internal connector.

c Set the fan tray aside in a safe place.

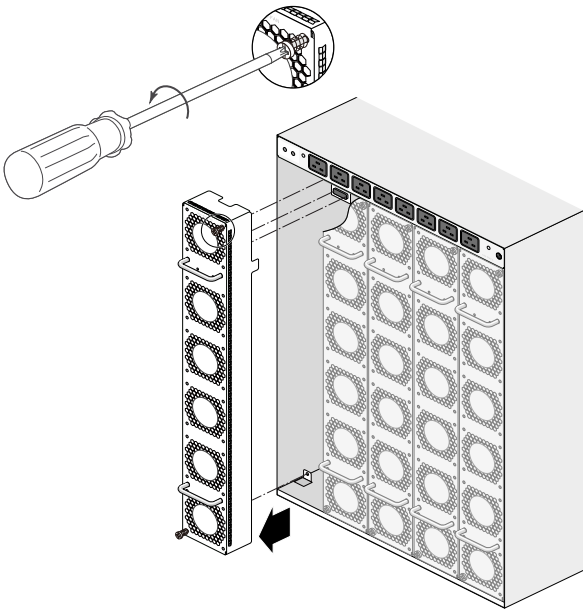

Figure 18: Removing the Fan Trays

9 Open the accessory box and locate the four lifting handles.

Caution

Never use the handles on the fan assemblies to lift the chassis. The handles and the fan assemblies are not designed to hold the weight of the chassis.

10 On each side of the chassis, set the pegs on the lifting handles into the mounting holes.

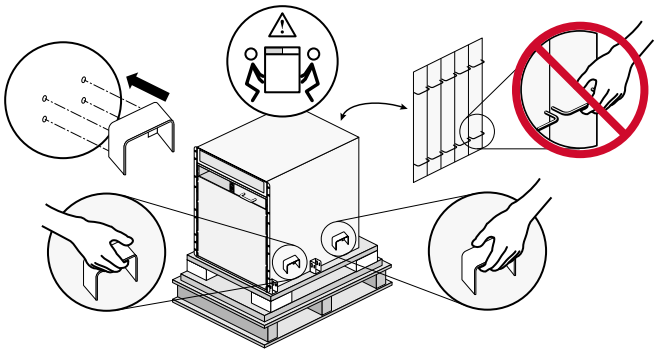

Figure 19: Preparing to Lift the Chassis from the Pallet

11 Verify that the following items are included in the shipping carton:

- BlackDiamond X8 chassis with installed front shipping cover and MM slot cover
- Power cord retainer
- Two 19-inch support brackets

Checking Pre-Installation Requirements

In addition to the support brackets that are shipped with the chassis, you need the following tools and equipment to install a chassis:

- Mid-mount bracket kit (model number 48020, ordered separately from the chassis)
- # 2 Phillips screwdriver for attaching the mid-mount brackets to the middle of the chassis sides
- Rack-mount screws appropriate for your organization's rack system, as follows:
  - 4 screws to attach each support bracket to the rack
  - 12 screws to secure the chassis in the rack

  The screw size will vary based on your organization's rack system; screws are not provided.
- Screwdriver appropriate for the selected rack mounting screws
- Chassis grounding materials as listed in Grounding the Chassis on page 48.

Rack-Mounting the Chassis

Note

The chassis provides three possible locations on each side for the mid-mount brackets, labeled A, B, and C. When you attach the brackets, make sure you use the same position on each side.

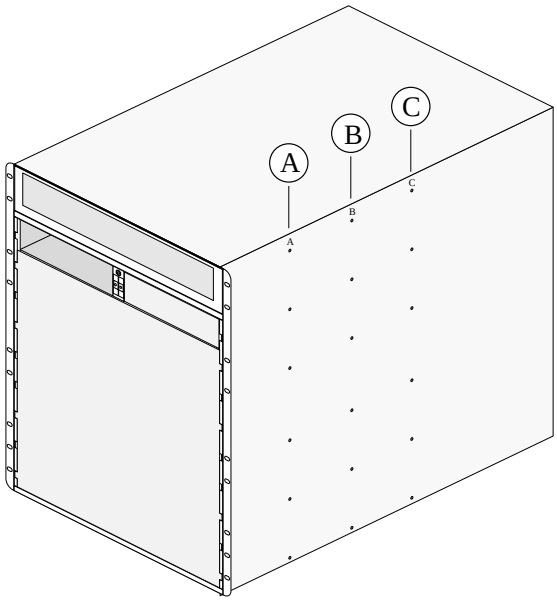

Figure 20: Locating Possible Mid-mount Bracket Points

Before you install the chassis, verify that none of the modules or power supplies have been pre-installed. Because of the weight of the chassis, it should be empty when you install it.

1 Attach mid-mount brackets to the sides of the chassis.

   a On each side of the chassis, align a mid-mount brackets with its mounting holes on the chassis sheet metal.

b Using a #2 Phillips screwdriver, insert and tighten the mounting screws to secure the bracket to the chassis.

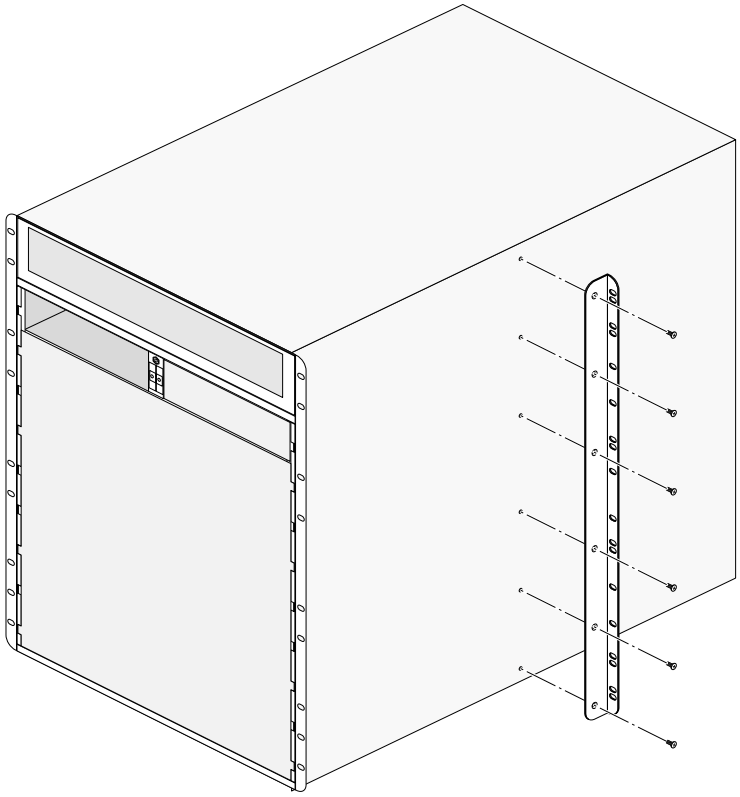

Figure 21: Attaching Mid-mount Brackets (position "C" shown)

2 Identify the rack location where the chassis will be installed.

3 Using four rack mounting screws, attach the support bracket to the equipment rack immediately below the intended chassis location.

Screws are not provided.

To provide wider support for the chassis as you install it, you can attach the second support bracket on the other side of the rack post.

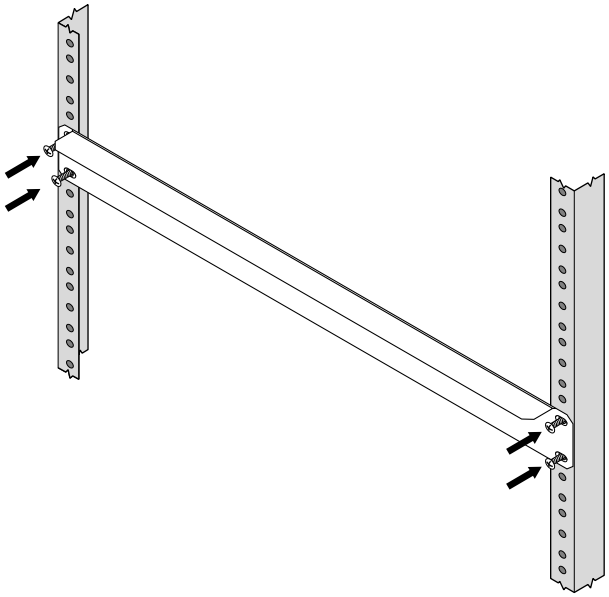

Figure 22: Attaching the Support Bracket

4 If necessary, attach the lifting handles to each side of the chassis.
5 From the front of the rack, lift the back of the empty chassis onto the support bracket.
6 If attached, remove the lifting handles from both sides of the chassis.
7 Slowly guide the chassis into the equipment rack until the mounting brackets are flush against the rack uprights.
8 Secure the chassis to the equipment rack using six rack mounting screws.

Screws are not provided.

9 Check to ensure screws are secure.

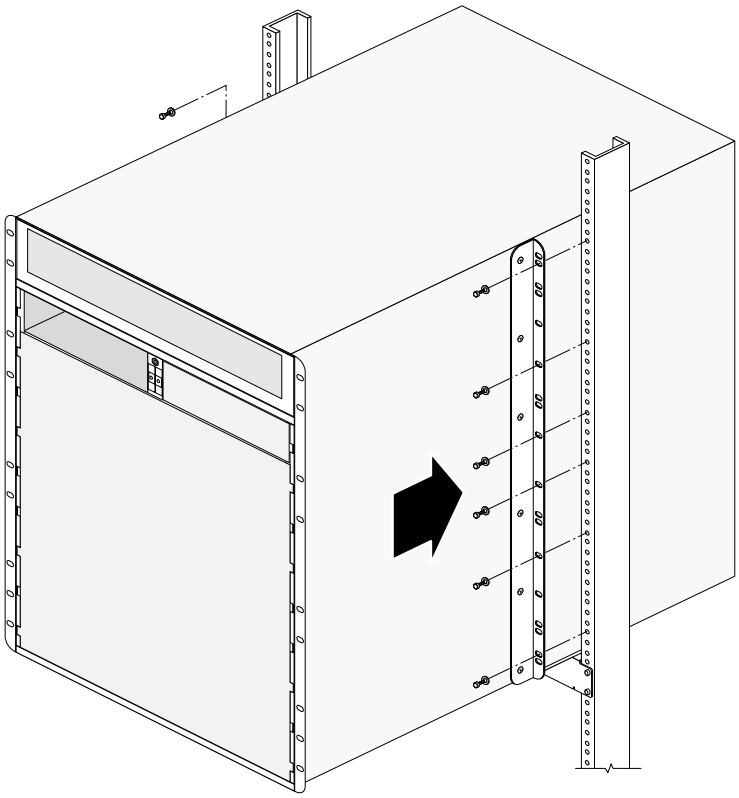

Figure 23: Securing the Chassis to the Rack

10 After the chassis is secured to the equipment rack, ground the chassis.

Grounding the Chassis

Although grounding the chassis is optional, it is recommended to do so. You must provide the following materials to ground the chassis:

- Two 10-24 screws
- One copper, standard barrel 2-hole compression grounding lug with 0.63-inch hole spacing, type LDC, equivalent to Panduit part number LCD4-14A-L or Thomas & Betts part number: LCN4-14
- # 14 AWG stranded copper wire

The rear panel of the chassis provides a grounding pad with threaded holes for attaching a ground cable.

1 Identify the grounding pad on the back of the chassis.

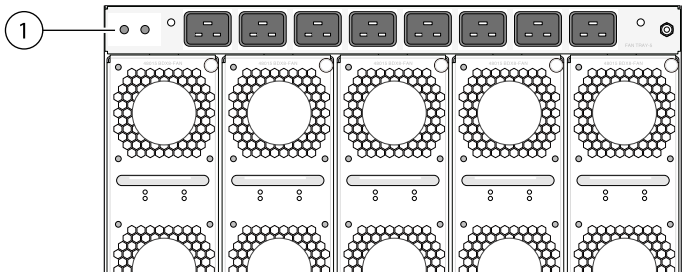

Figure 24: Grounding Pad on the Chassis

1 = Grounding pad

2 Strip 0.5 inch (1.2 cm) of insulation from the stranded copper wire cable.
3 Insert the stripped wire into the cable lug.
4 Crimp the lug securely onto the cable.
5 Insert the screws through the lug and into the grounding pad on the back of the chassis.
6 Connect the other end of the wire to a known reliable earth ground point at your site.

After the chassis is grounded, install two or more power supplies.

Installing Power Supplies

You need the following tools and equipment to install an AC power supply:

- # 2 Phillips screwdriver.
- AC power cord rated for 100-120/200-240 VAC.

Warning
Be sure to read Safety Information on page 98 before you begin this procedure.

An AC power cord is not included with the chassis. You must obtain a power supply cord that meets the requirements listed under Selecting Power Supply Cords on page 101.

1 Remove the power supply ventilation cover.
   a Loosen the retaining screws at the top corners of the cover panel.
   b Pull outward on the retaining screws to tilt the cover panel away from the front of the chassis.

c Lift the cover panel away from the chassis.

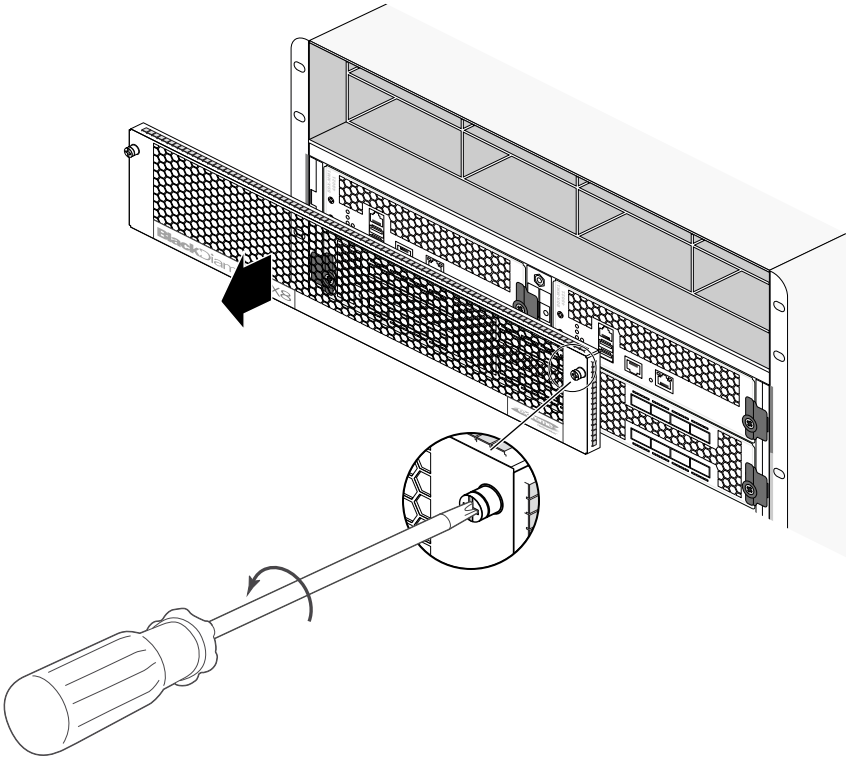

Figure 25: Removing the Power Supply Ventilation Cover

2 Identify the power supply bay where you will install the power supply.

Power supply bays are numbered from 1A to 8B. To establish an N+N redundant power configuration, install power supplies in both the upper and lower rows.

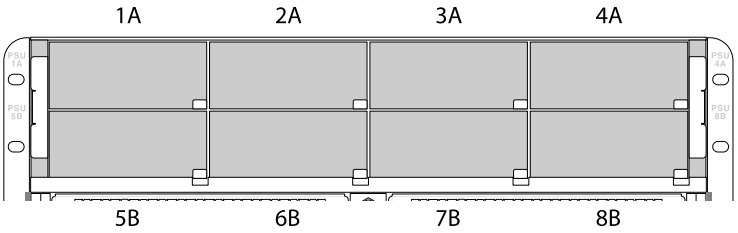

Figure 26: Power Supply Bay Numbering on the Chassis

3 On the front of the power supply, push the release button to unlatch the insertion/ejector lever.

4 Slide the power supply into the chassis until the lever starts to engage.

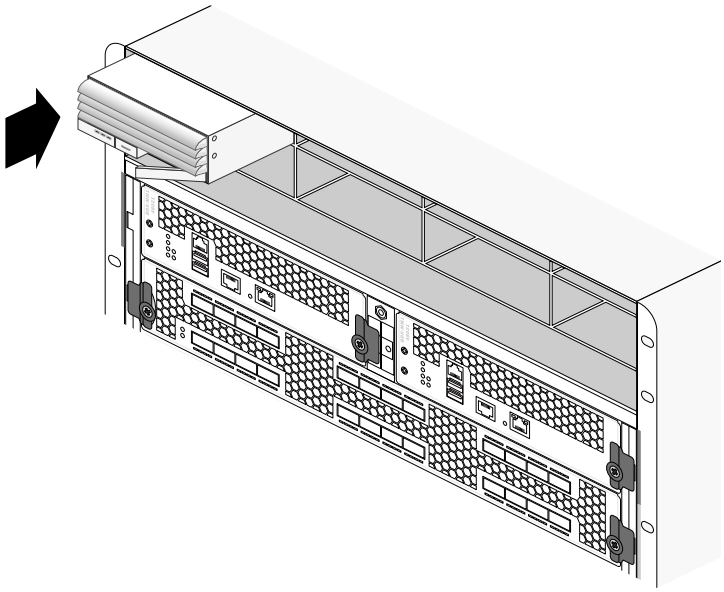

Figure 27: Installing a Power Supply

5 Rotate the lever toward the front of the power supply to fully seat the power supply in the chassis.
6 Repeat steps to install other power supplies as required by your system configuration.
7 Replace the power supply ventilation cover.
   a Set the lower edge of the cover in place so that the tabs on the edge fit into the matching slots in the chassis frame.
   b Rotate the top of the cover into place against the front of the chassis frame.

c Align and tighten the retaining screws.

Important

Do not operate the BlackDiamond X8 chassis without the power supply cover in place. This cover is required to maintain proper EMI levels for the switch.

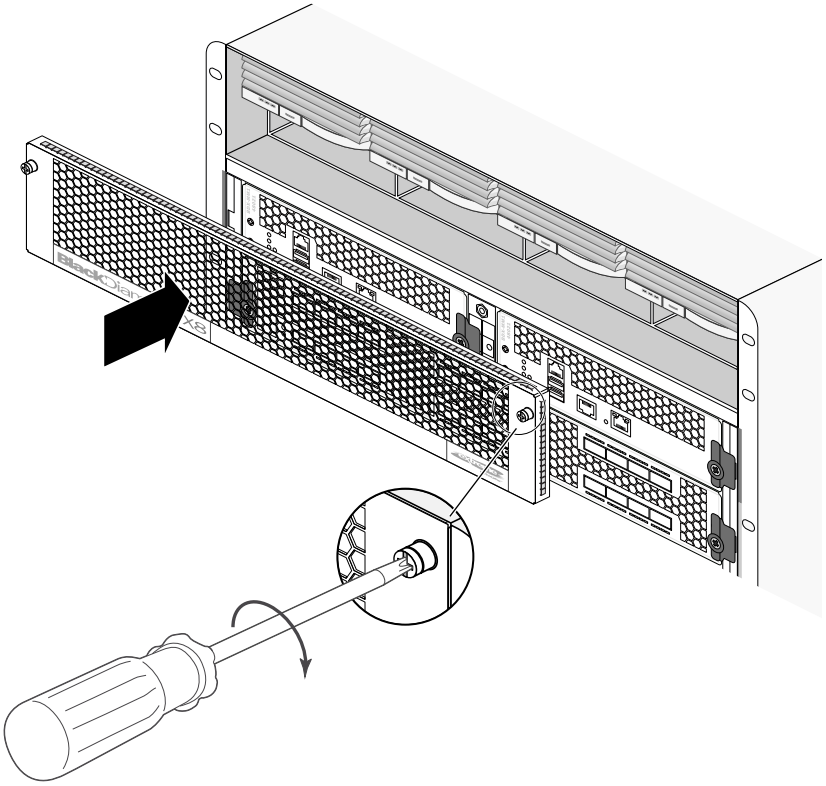

Figure 28: Installing the Power Supply Ventilation Cover

Connecting Power Cords

Warning

Be sure to read Safety Information on page 98 before you begin this procedure.

Warning

Do not apply power to the chassis until you have finished installing all modules, fan trays, and module blanks. To apply power and access the chassis, see Applying Power and Accessing the Chassis for the First Time on page 65

Use the following procedure to connect the AC power cords and the cord retainer.

1 At the back of the chassis, connect an AC power cord to the power input socket that corresponds to each installed power supply.

Power input sockets are numbered from 1A to 8B from left to right, as you face the chassis back.

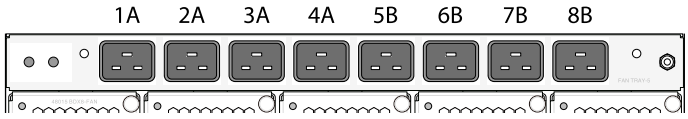

Figure 29: Numbers for Power Connectors

2 After all the power cords have been connected, set the power cord retainer over the power cord connectors and against the back of the chassis.

3 Align and tighten the captive retaining screws on the power cord retainer.

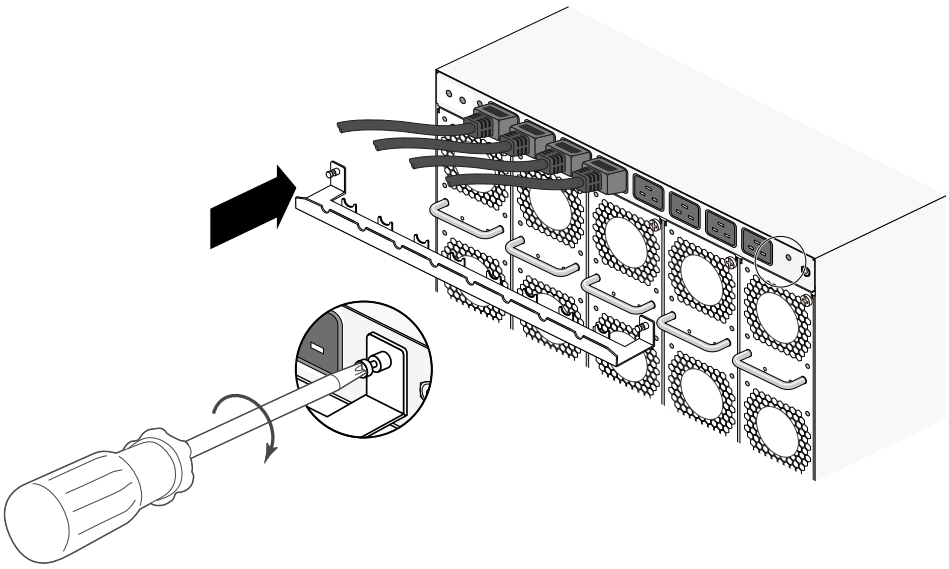

Figure 30: Installing the AC Power Cord Retainer

6 Installing BlackDiamond X8 Series Modules

Initial System Installation and Module Installation Order
Required Tools
Installing Fabric Modules
Installing Management Modules
Installing I/O Modules
Applying Power and Accessing the Chassis for the First Time

The following sections describe how to install the modules and module blanks into the BlackDiamond X8 chassis.

Note
The BlackDiamond X8 chassis should already be installed before you install any modules into the chassis. See Installing a BlackDiamond X8 Series Chassis on page 41 for chassis installation procedures.

Warning
Do not apply power to the chassis until you have finished installing all modules and module blanks.

Initial System Installation and Module Installation Order

After the chassis is installed, you can install the modules and module blanks. For an initial system installation, the recommended order for installing modules and module blanks into the chassis is:

1. Install all fabric modules (FMs).
2. Install all management modules (MMs).
3. Install MM blanks in any unoccupied slot.
4. Install I/O modules.
5. Install I/O blanks in any unoccupied slot.
6. Apply power to the chassis.

Required Tools

You need the following tools and equipment to install modules:

- ESD-preventive wrist strap
- #2 Phillips screwdriver for the retaining screws on the fan tray and locking screws on management and I/O modules
- 5/16-inch flat-tip screwdriver for the retaining screws on the fabric module

Installing Fabric Modules

Install all the fabric modules before you install I/O modules.

The slots for fabric modules are numbered 1 through 4, from left to right. If you are installing only three fabric modules, use slots 1 through 3.

1 Attach the ESD-preventive wrist strap to your bare wrist.
2 If it is not already connected, connect the metal end to the receptacle at the right of the power input connectors.
3 Remove the fan tray from each location where you will install a fabric module.

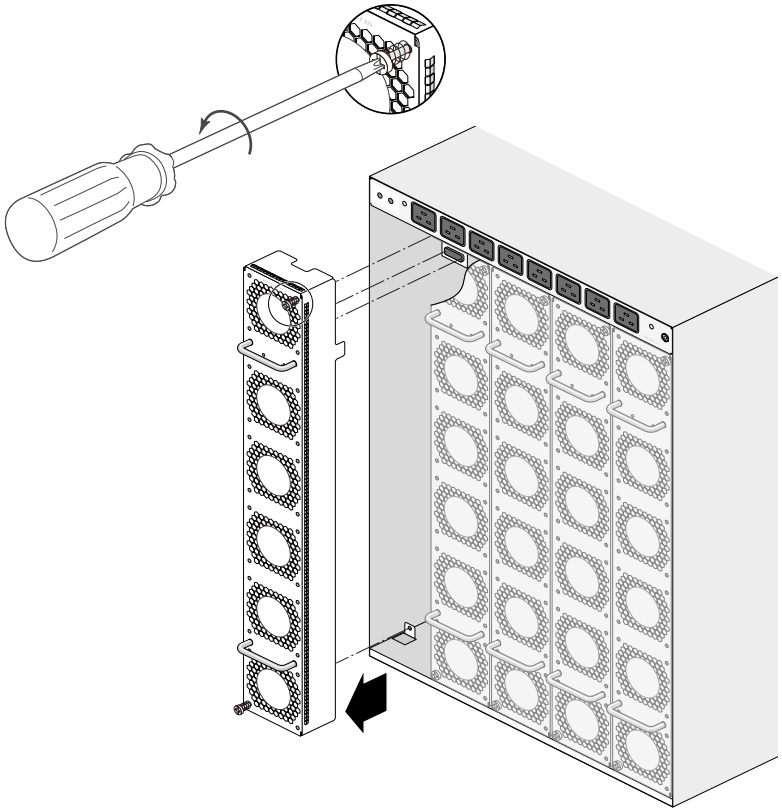

Figure 31: Removing a Fan Tray

4 Install each fabric module.

a Loosen the screws on the insertion/extraction levers and open the levers.

Caution

To prevent ESD damage, hold the module by the metal rail and front panel only. Never touch the components on the PCB or the pins on any of the connectors.

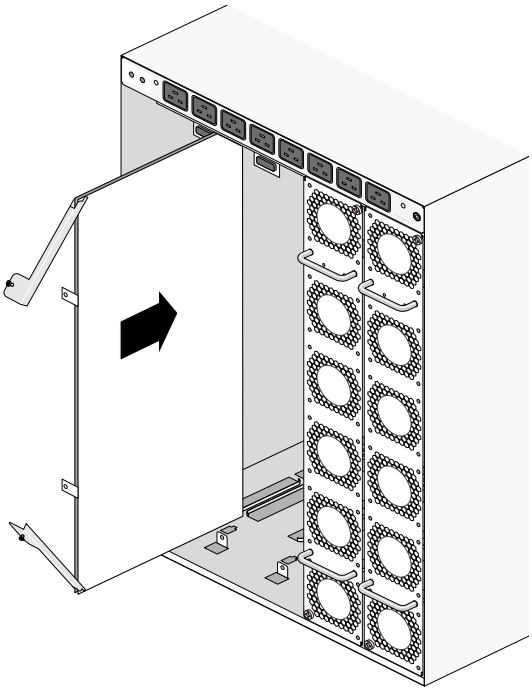

Figure 32: Installing a Fabric Module

b Align the circuit board with the guides at the top and bottom of the chassis and slide the module into the chassis.

c When the levers start to engage, push them toward the module to seat the module in the chassis.

d Align and tighten the retaining screws to fasten the module in place.

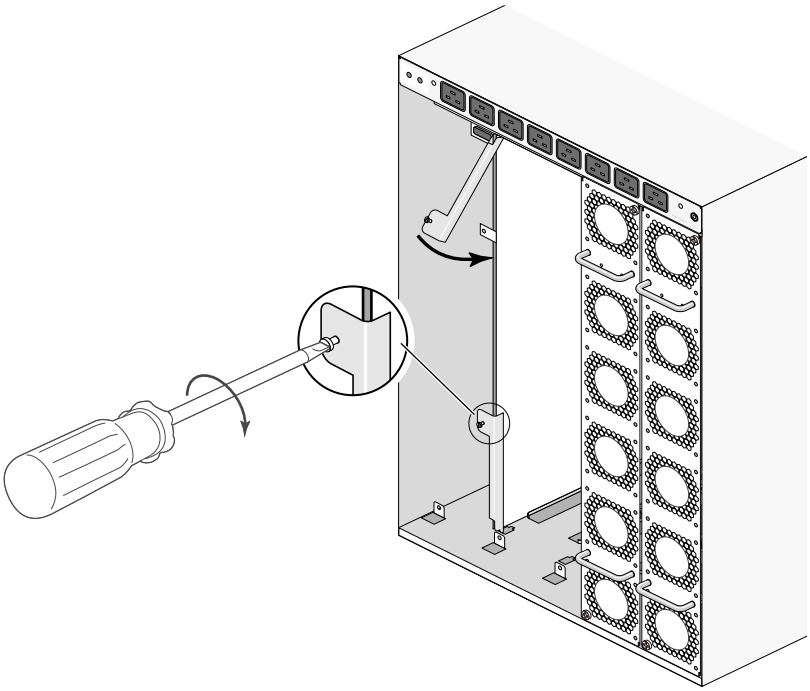

Figure 33: Securing a Fabric Module

5 Repeat these steps to install additional fabric modules.

6 Re-install the removed fan trays.

a Set each fan tray into the chassis and push it firmly into place.

b Align and tighten the retaining screws.

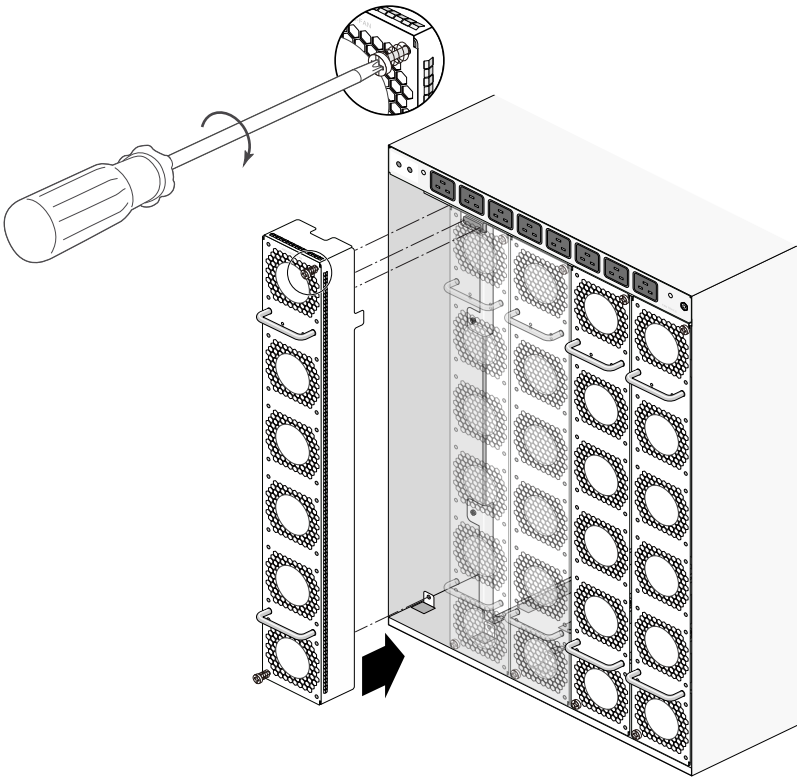

Figure 34: Installing a Fan Tray

Installing Management Modules

Slots for management modules are labeled A and B. Install the first management module in slot A.

1 Attach the ESD-preventive wrist strap to your bare wrist.
2 If it is not already connected, connect the metal end to the receptacle between the management module slots.
3 If necessary, remove the cover from the unoccupied slot.
4 Remove the module from the antistatic packaging.

Caution

To prevent ESD damage, hold the module by the metal rail and front panel only. Never touch the components on the PCB or the pins on any of the connectors.

5 Verify that the injector/ejector handle is in the open position.

Keep the injector/ejector handle in the open position as you slide the module into the chassis slot.

6 Carefully slide the module into the slot (starting with slot A) until the injector/ejector handle engages the edge of the chassis and begins to rotate toward the module.

7 Use the lever to fully seat the module internal connectors.

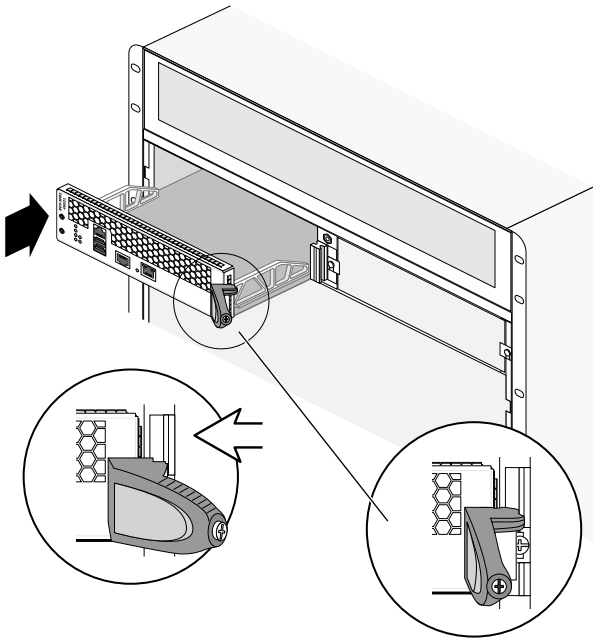

Figure 35: Seating the Management Module

8 Use a # 2 Phillips screwdriver to lock the handle into place.

When the locking screw is fully tightened, the yellow band around the screw head is completely hidden.

Caution

Be careful to avoid over-torquing and stripping the screw head.

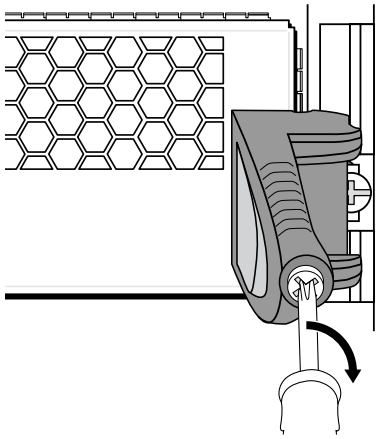

Figure 36: Locking the Module into Place

9 Install module blanks in all remaining unoccupied slots.

Caution

All unoccupied management module slots in a BlackDiamond X8 series switch must have module blanks correctly installed to ensure conformance to FCC requirements as well as to maintain adequate airflow through the switch.

Installing a Management Module Blank

Install a blank management module in every unoccupied management slot.

Caution

If a management module is not installed in a slot, you must install a blank cover over the slot to maintain proper EMI levels and ventilation, to ensure conformance to FCC requirements, and to maintain adequate airflow through the switch.

1 Set the blank in place over the open slot.
2 Align and tighten the captive retaining screws.

Installing I/O Modules

Slots for I/O modules are numbered 1 through 8, starting at the top.

Caution

All unoccupied I/O module slots must be covered by I/O module blanks to ensure proper system ventilation and EMI compliance. Individual I/O module blanks are purchased separately from the chassis. See Installing I/O Module Blanks on page 62 to install I/O blanks.

1 Attach the ESD-preventive wrist strap to your bare wrist.
2 If it is not already connected, connect the metal end to the receptacle between the management module slots.
3 Holding the module by the metal rail and front panel only, remove the module from the antistatic packaging.

Caution

To prevent ESD damage, never touch the components on the PCB or the pins on any of the connectors.

4 Verify that the module injector/ejector handles are open.

Keep the injector/ejector handles in the open position as you slide the module into the chassis slot.

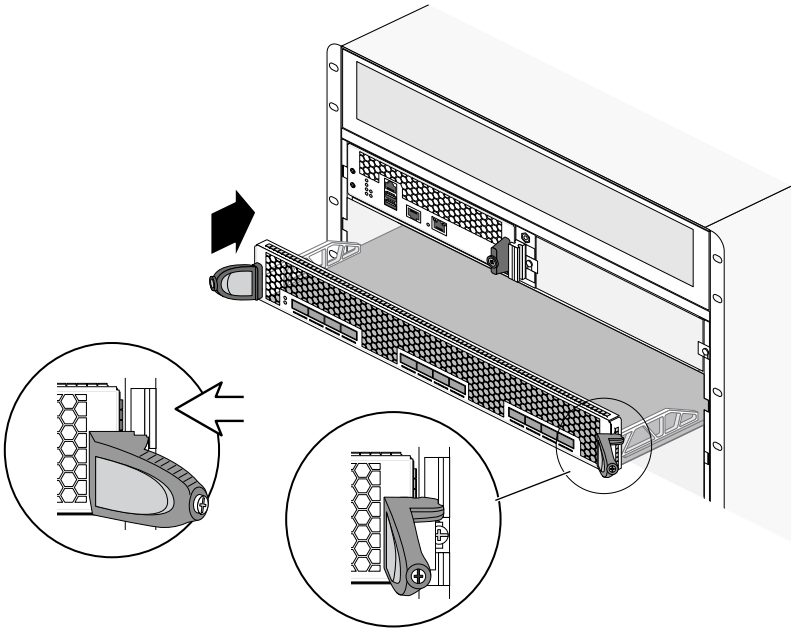

Figure 37: Installing an I/O Module

Note

If the injector/ejector handles are in the latched position, they prevent the module from sliding all the way into the slot.

5 Carefully slide the module into the slot until the injector/ejector handles engage the edges of the chassis and begin to rotate toward the center of the module.

6 Push the handles toward each other to seat the module internal connectors.

7 Use a # 2 Phillips (cross-head) screwdriver to lock each handle into place.

When a locking screw is fully tightened, the yellow band around the screw head is completely hidden.

Caution

Be careful to avoid over-torquing and stripping the screw heads.

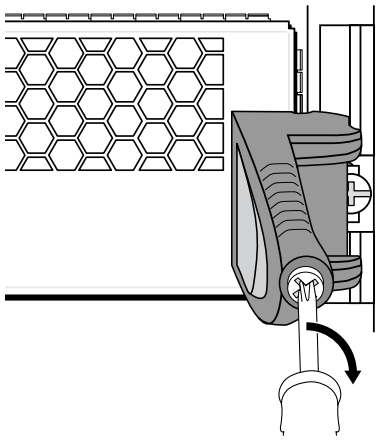

Figure 38: Locking the Module into Place

Installing I/O Module Blanks

Switches are shipped with a reinforcing shipping cover installed over all the I/O module slots. If you have the older module blanks without thumb levers, see Installing I/O Module Blanks (without thumb levers) on page 64.

You need a #2 Phillips screwdriver to install a module blank.

After you have installed all the I/O modules for your system configuration, you must install module blanks in all remaining unoccupied slots.

Caution

All unoccupied slots in a BlackDiamond X8 series switch must have module blanks correctly installed to ensure conformance to FCC requirements as well as to maintain adequate airflow through the switch.

1 Verify that the I/O module blank injector/ejector handles are open.

Keep the injector/ejector handles in the open position as you slide the I/O module blank into the unoccupied chassis slot.

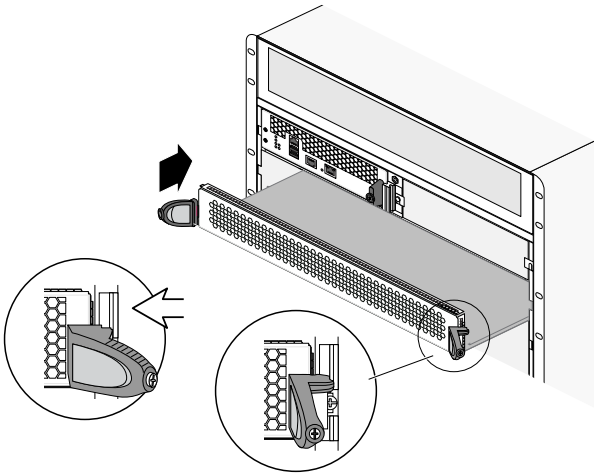

Figure 39: Installing an I/O Module Blank

Note

If the injector/ejector handles are in the latched position, they prevent the I/O module blank from sliding all the way into the slot.

2 Carefully slide the I/O module blank into the slot until the injector/ejector handles engage the edges of the chassis and begin to rotate toward the center of the module.

3 Push the handles toward each other to seat the I/O module blank.

4 Use a # 2 Phillips screwdriver to lock each handle into place.

When a locking screw is fully tightened, the yellow band around the screw head is completely hidden.

Caution

Be careful to avoid over-torquing and stripping the screw heads.

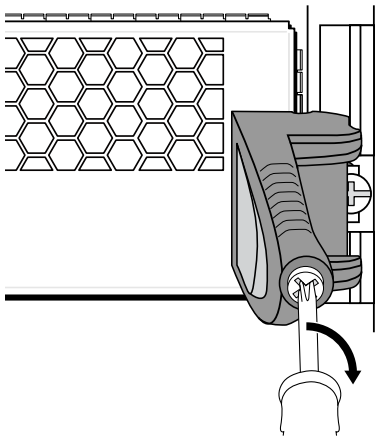

Figure 40: Locking the I/O module blank into place

Installing I/O Module Blanks (without thumb levers)

Some of the older BDX chassis were shipped with module blanks without thumb levers. Use the following procedure if you have these older module blanks. If you have the newer module blanks with thumb levers, see Installing I/O Module Blanks on page 62.

You need a #2 Phillips screwdriver to install a module blank without thumb levers.

After you have installed all the I/O modules for your system configuration, you must install module blanks in all remaining unoccupied slots.

Caution

All unoccupied slots in a BlackDiamond X8 series switch must have module blanks correctly installed to ensure conformance to FCC requirements as well as to maintain adequate airflow through the switch.

1 Check the condition of the EMI gaskets along the front panel edges of the blank, and confirm that the gaskets are not damaged.

2 Align the module blank with the card guides for the open slot on the chassis.

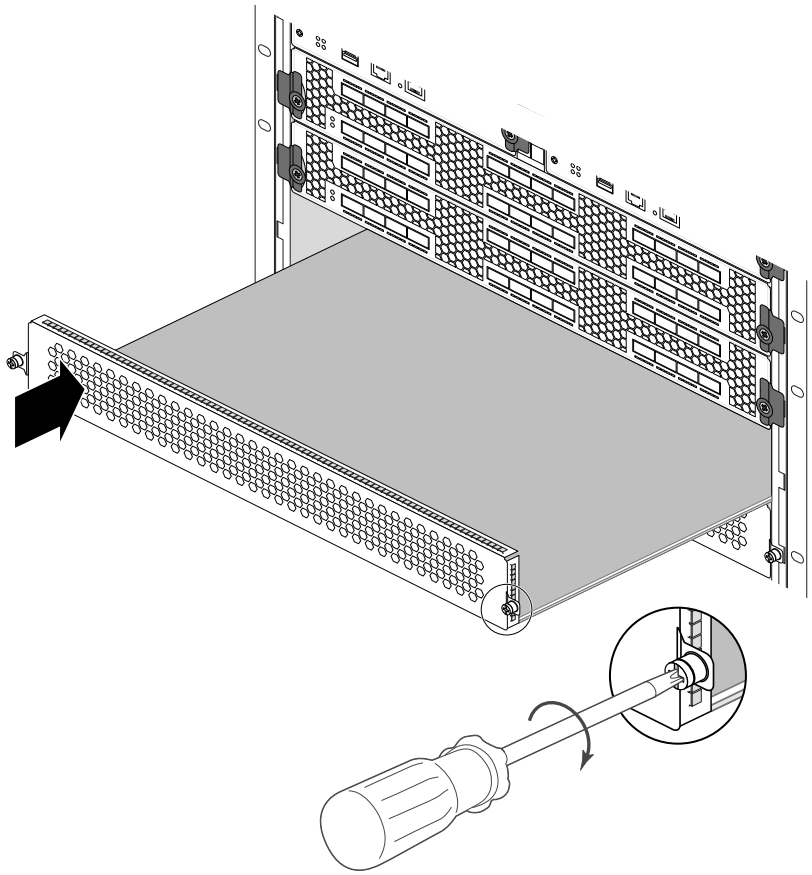

Figure 41: Installing a Module Blank without thumb levers

3 Use a #2 Phillips screwdriver to tighten the captive screws at each end of the module blank.Tighten the screws of each installed module blank before inserting additional modules or blanks. Otherwise, you might unseat modules or blank front panels that you have not secured

Applying Power and Accessing the Chassis for the First Time

After you have installed all of the modules and module blanks, apply power to the chassis. After the BlackDiamond X8 has completed all power on self-tests, it is operational.

To access the chassis, appropriate cables are available from your local supplier, or you can make your own. To ensure the electromagnetic compatibility of the unit, use only shielded serial cables. For information about the DB-9 console plug connector, see Connector Pinouts on page 115.

You can log in and configure an IP address for the default VLAN (named default).

Note

In BlackDiamond switches, the management port on the management module is part of the management VLAN by default. Refer to Management Module Ports Overview on page 11 for further details.

Using the Console Port

Connection to the console port is used for direct local management. The terminal or PC with terminal-emulation software that you connect to an Extreme Networks switch must be configured with the following settings to access the BlackDiamond X8 through the console port:

- Baud rate: 9600
- Data bits: 8
- Stop bit: 1
- Parity: None
- Flow control: XON/XOFF

Note

The procedure for using terminal-emulation software is described in more detail in the documentation supplied with the terminal.

Logging In for the First Time

Log in and manually configure the IP settings.

1. Connect a terminal or PC with terminal-emulation software to the management module in the switch.
2. At the terminal, press **Enter** one or more times until you see the login prompt.
3. At the login prompt, enter the default user name admin to log on with administrator privileges.

   login: admin

   The system will ask a series of questions about the default management settings, which allow all forms of management access for convenience in setting the initial configuration. Administrator capabilities allow you to access all switch functions.
4. Answer each question based on the level of security needed for the particular management access type.

   Note

   For more information about logging in to the switch and configuring switch management access, see the *ExtremeXOS Concepts Guide*.
5. At the password prompt, press **Enter**.

   The default user name admin has no password assigned to it.

   When you have successfully logged on to the system, the command line prompt displays the system name (for example, BlackDiamonX8>) in the prompt.

   Note

   For more information about how to assign a specific system name, see the ExtremeXOS Concepts Guide.
6. Type `configure vlan default ipaddress 123.45.67.8 255.255.255.0` to assign an IP address and subnetwork mask for VLAN default.

   Your changes take effect immediately.

7 Type `save`.

Your configuration changes are saved so that they will be in effect after the next system reboot. The configuration is saved to the configuration database of the management modules in the switch.

8 Type `logout`.

7 Maintaining the BlackDiamond X8

Replacing a Power Supply
Replacing a Fan Tray
Replacing a Fabric Module
Replacing a Management Module
Reseating a Management Module DIMM
Packing the Chassis for Shipping

The following sections contain maintenance procedures for the BlackDiamond X8. The procedures include:

- Replacing a Power Supply on page 68
- Replacing a Fan Tray on page 71
- Replacing a Fabric Module on page 73
- Replacing a Management Module on page 79
- Reseating a Management Module DIMM on page 89
- Packing the Chassis for Shipping on page 92

Replacing a Power Supply

You need a #2 Phillips screwdriver to remove the power supply ventilation cover.

1 Remove the power supply ventilation cover.

Caution

Do not operate the BlackDiamond X8 switch without the power supply ventilation cover in place. This cover is required to maintain conformance to FCC emissions regulatory requirements and proper EMI levels for the switch.

a Loosen the retaining screws at the top corners of the cover panel.

b Pull outward on the retaining screws to tilt the cover panel away from the front of the chassis.

c Lift the cover panel away from the chassis.

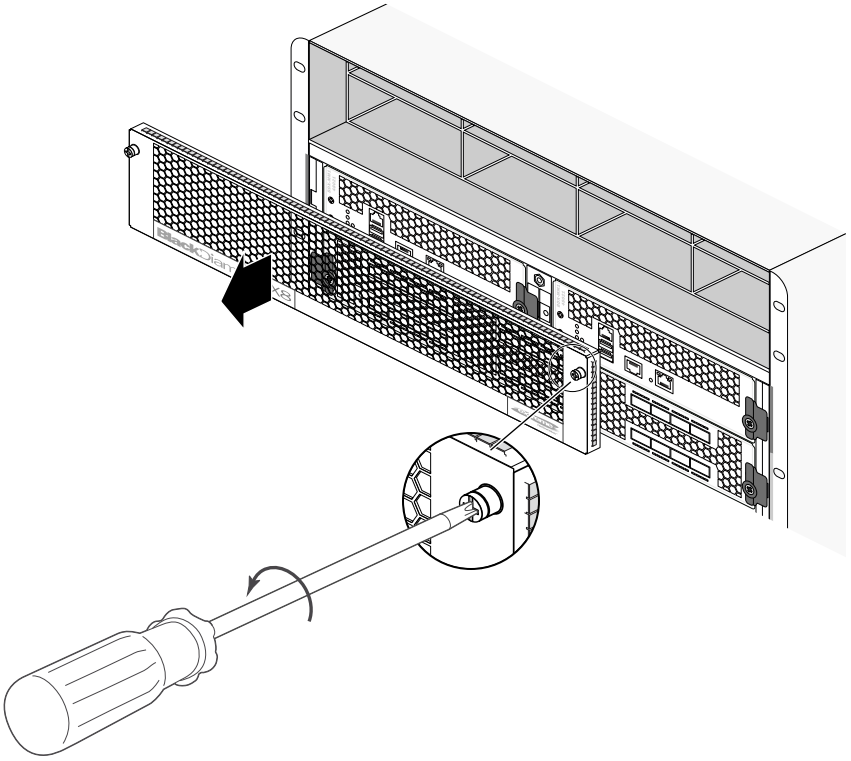

Figure 42: Removing the Power Supply Ventilation Cover

2 Push the release button for the inserter/extractor lever on the front of the power supply.

3 Rotate the inserter/extractor lever to the right to unseat the power supply from the internal connectors.

4 Carefully slide the power supply out of the chassis and set it aside.

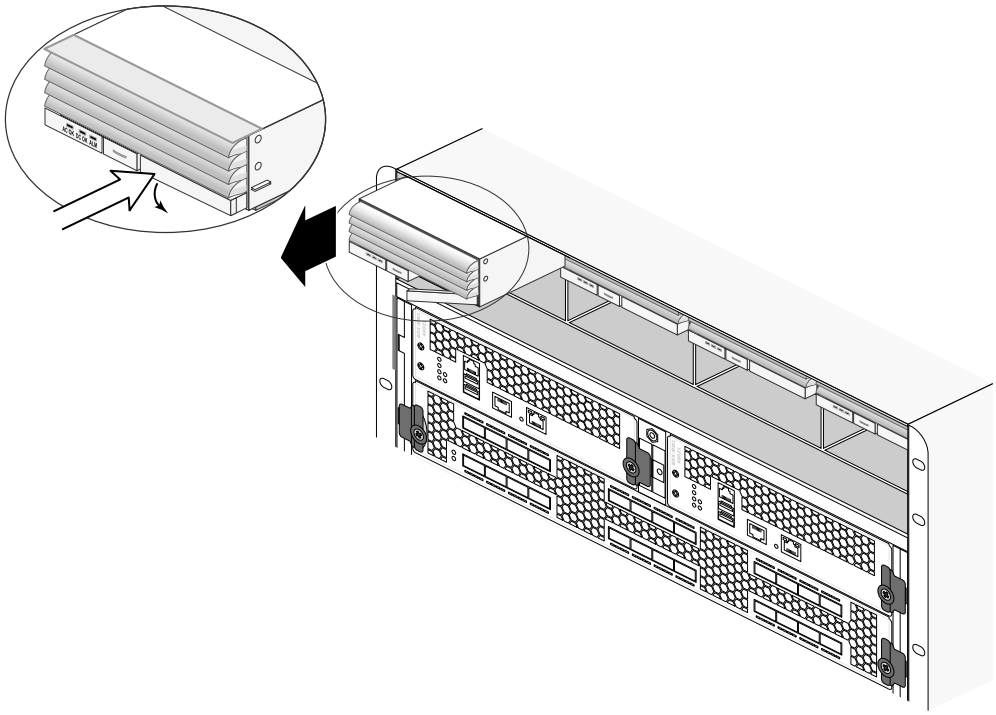

Figure 43: Removing a Power Supply

5 On the front of the replacement power supply, push the release button for the insertion/ejector lever.

6 Slide the power supply into the chassis until the lever starts to engage.

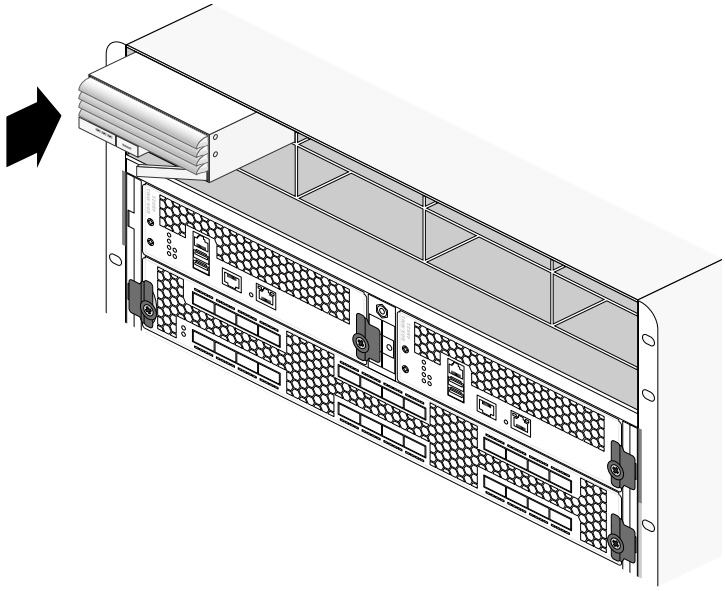

Figure 44: Installing a Power Supply

7 Rotate the lever toward the front of the power supply to fully seat the power supply in the chassis.
8 Replace the power supply ventilation cover.
   a Set the lower edge of the cover in place so that the tabs on the edge fit into the matching slots in the chassis frame.
   b Rotate the top of the cover into place against the front of the chassis frame.
   c Align and tighten the retaining screws.

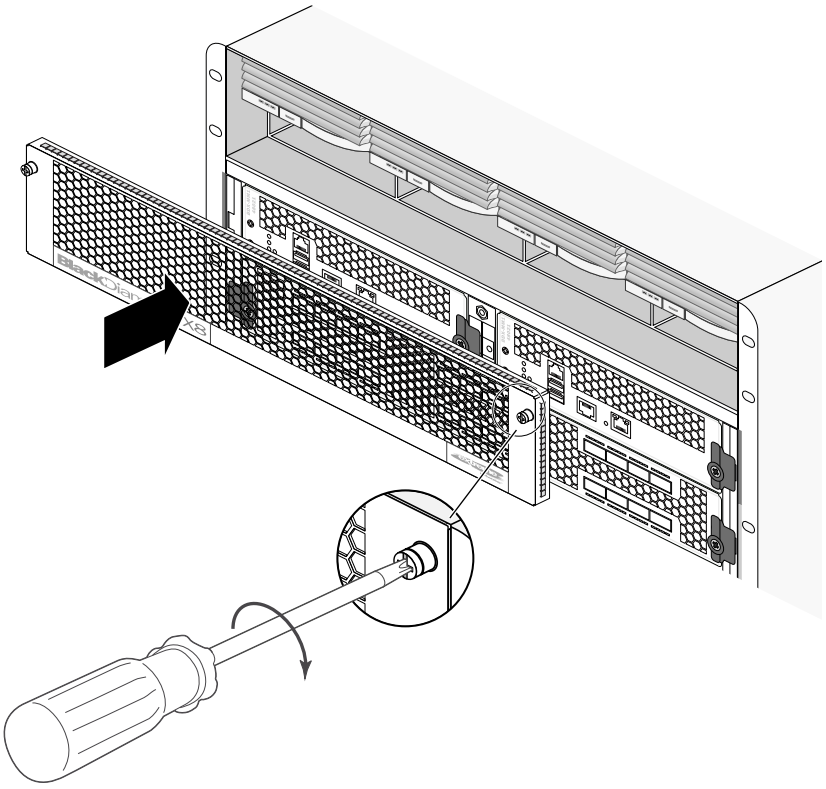

Figure 45: Installing the Power Supply Ventilation Cover

Replacing a Fan Tray

You need a #2 Phillips screwdriver to replace a fan tray. You can replace a fan tray without powering down the switch.

1 Completely loosen the retaining screws at the top and bottom of the fan tray.

2 Holding both handles, pull straight outward on the fan tray to disconnect the internal connector.

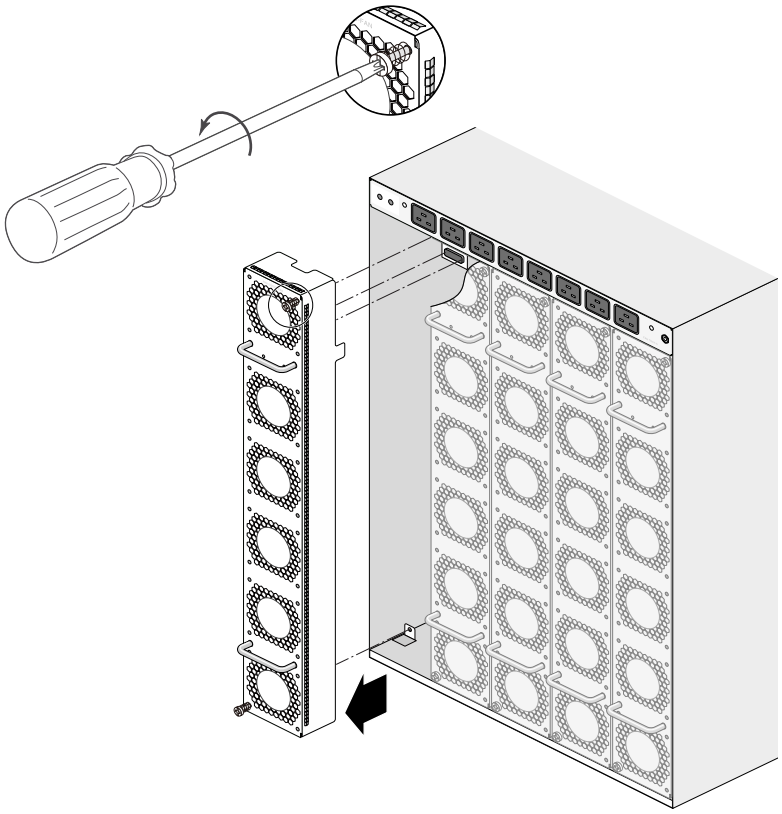

Figure 46: Removing a Fan Tray

3 Set the fan tray aside in a safe place.

4 Holding the replacement fan tray with both handles, align it with the opening and slide it straight into the chassis.

Caution

If a fan tray is to be replaced while the BlackDiamond X8 is operating, the new fan tray should be ready to insert. Insert the replacement within five minutes to insure the BlackDiamond X8 does not overheat.

5 Align and tighten the retaining screws.

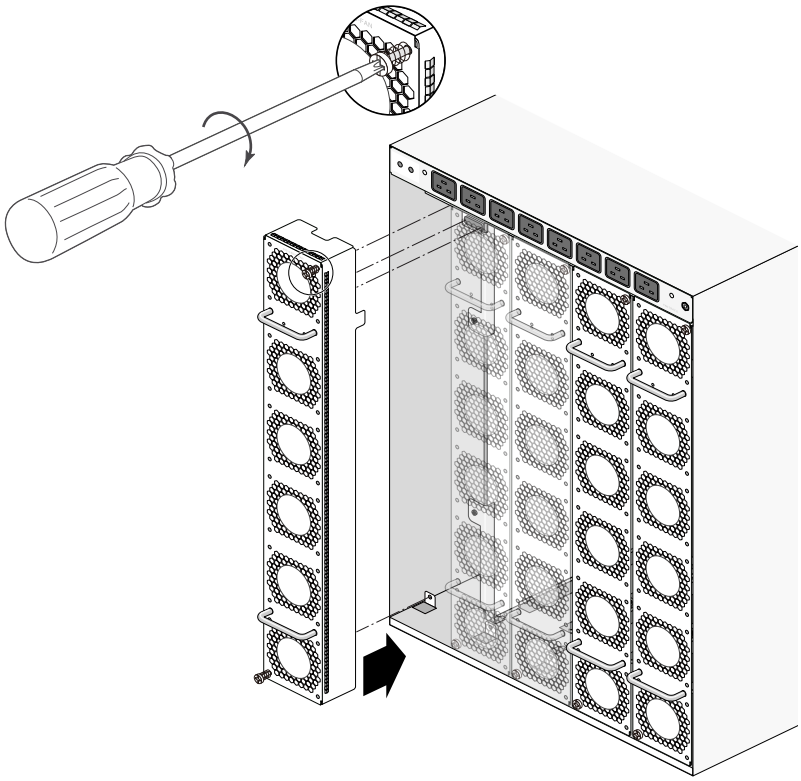

Figure 47: Installing a Fan Tray

Replacing a Fabric Module

You need a the following tools to replace a fabric module:

- ESD-preventive wrist strap
- #2 Phillips (cross-head) screwdriver for the retaining screws on the fan tray
- 5/16-inch flat-tip screwdriver for the retaining screws on the fabric module

You can replace a fabric module without powering down the switch.

Caution
If a fabric module is to be replaced while the BlackDiamond X8 is operating, the new fabric module should be ready to insert. Insert the replacement and replace the fan tray within five minutes to insure the BlackDiamond X8 does not overheat.

1 Attach the ESD-preventive wrist strap to your bare wrist.
2 If it is not already connected, connect the metal end to the receptacle at the right of the power input connectors.
3 Remove the fan tray in front of the faulty fabric module.
   a Loosen the captive retaining screws at the top and bottom of the fan tray.

b Holding both handles, pull the fan tray straight out of the chassis.

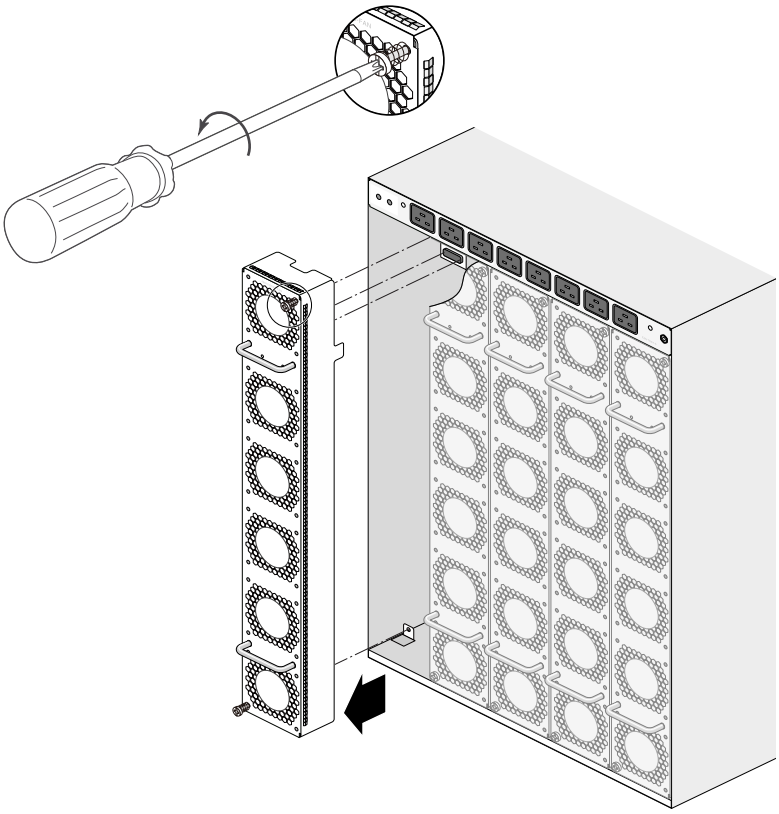

Figure 48: Removing a Fan Tray

4 Set the fan tray aside in a safe place.

5 Remove the fabric module.

a Loosen the retaining screw on each inserter/extractor lever on the fabric module.

b Simultaneously rotate both levers toward the ends of the module to unseat the internal connectors (Figure 49: Unseating a Fabric Module on page 75).

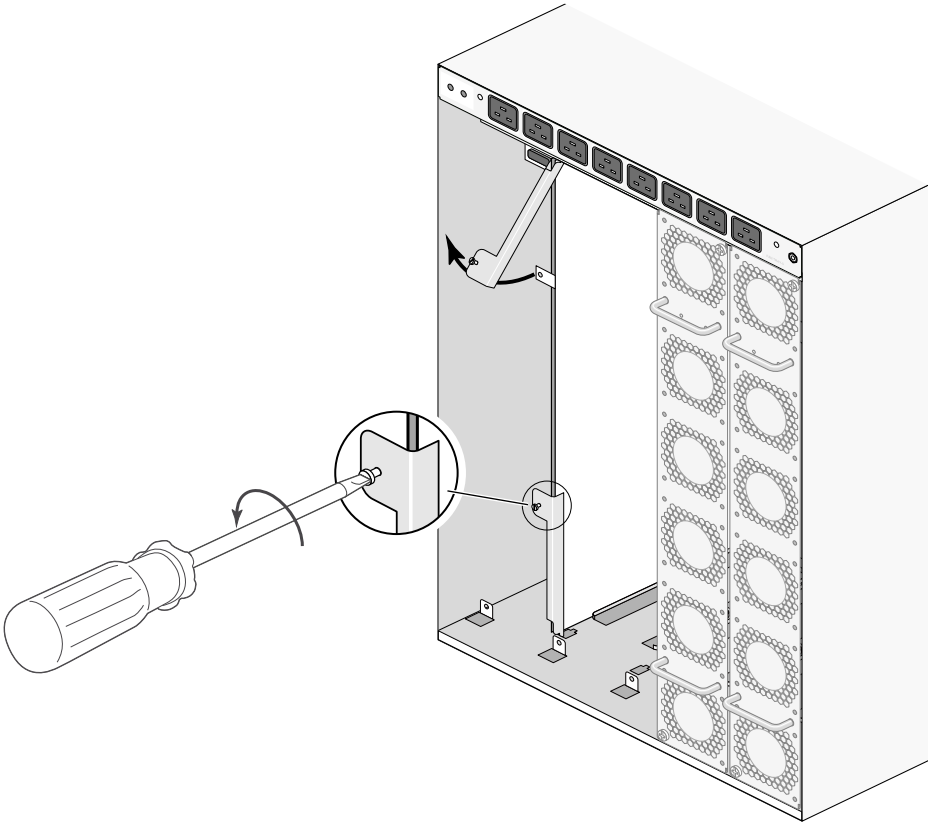

Figure 49: Unseating a Fabric Module

c Carefully slide the module out of the switch chassis and immediately place the module into an anti-static bag to protect it from potential ESD damage. The bag will also prevent dust from collecting on the module connectors.

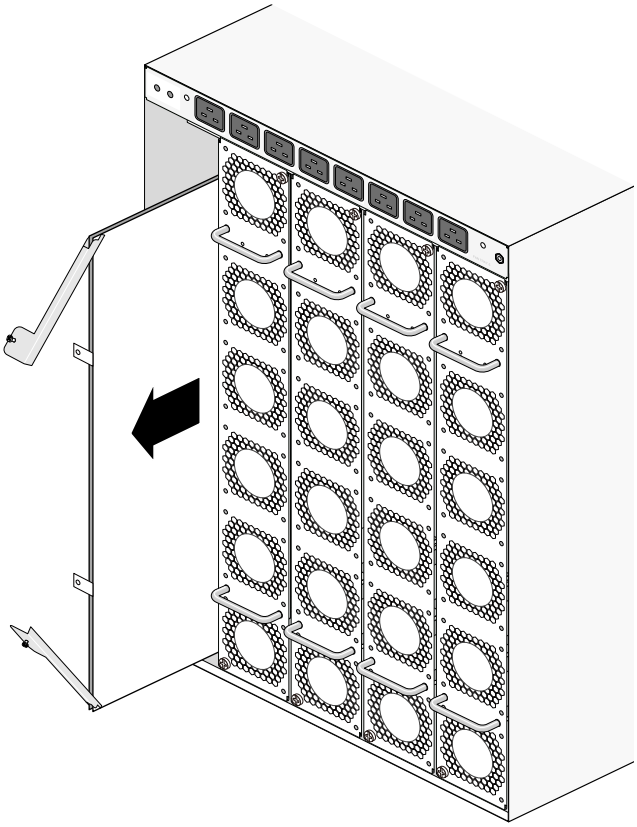

Figure 50: Removing a Fabric Module

6 Install the replacement fabric module.

a Remove the module from the antistatic packaging.

b Loosen the screws on the insertion/extraction levers and open the levers.

c Align the circuit board with the guides at the top and bottom of the chassis and slide the module into the chassis.

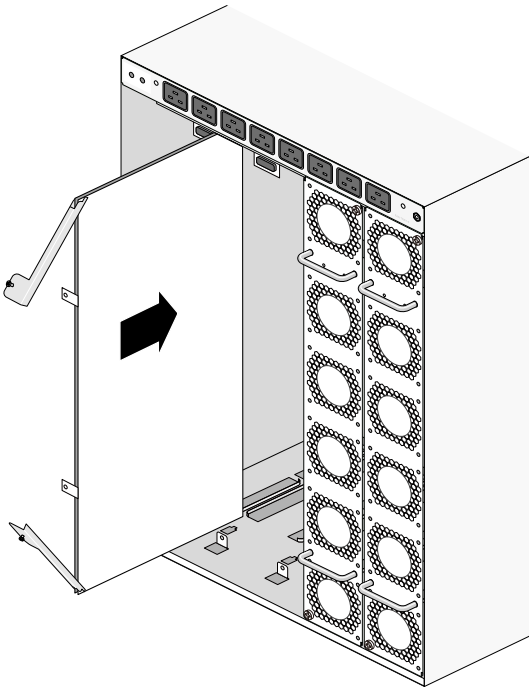

Figure 51: Installing a Fabric Module

d When the levers start to engage, push them toward the module to seat the module in the chassis.

e Align and tighten the retaining screws to fasten the module in place.

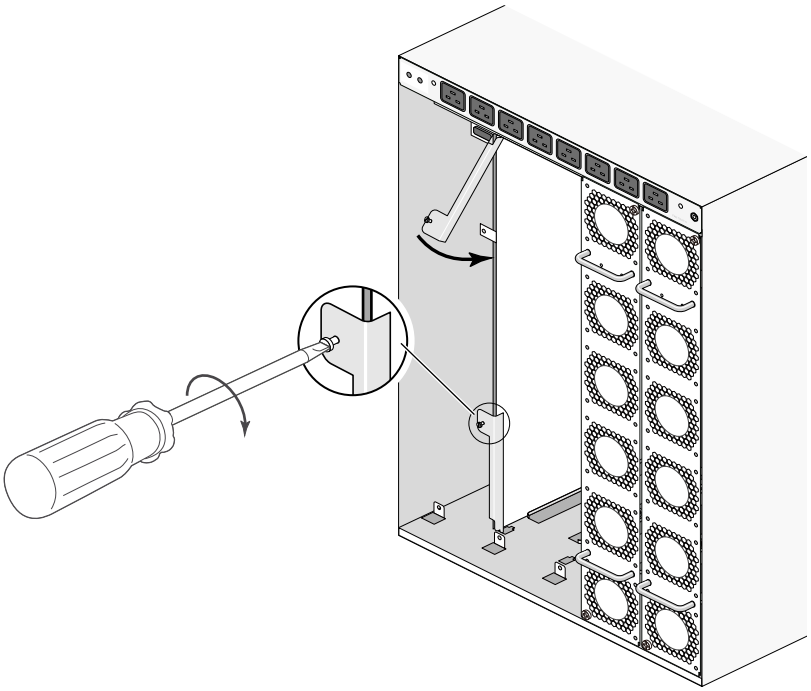

Figure 52: Securing a Fabric Module

7 Re-install the removed fan tray.

a Set the fan tray into the chassis and push it firmly into place.

b Align and tighten the retaining screws.

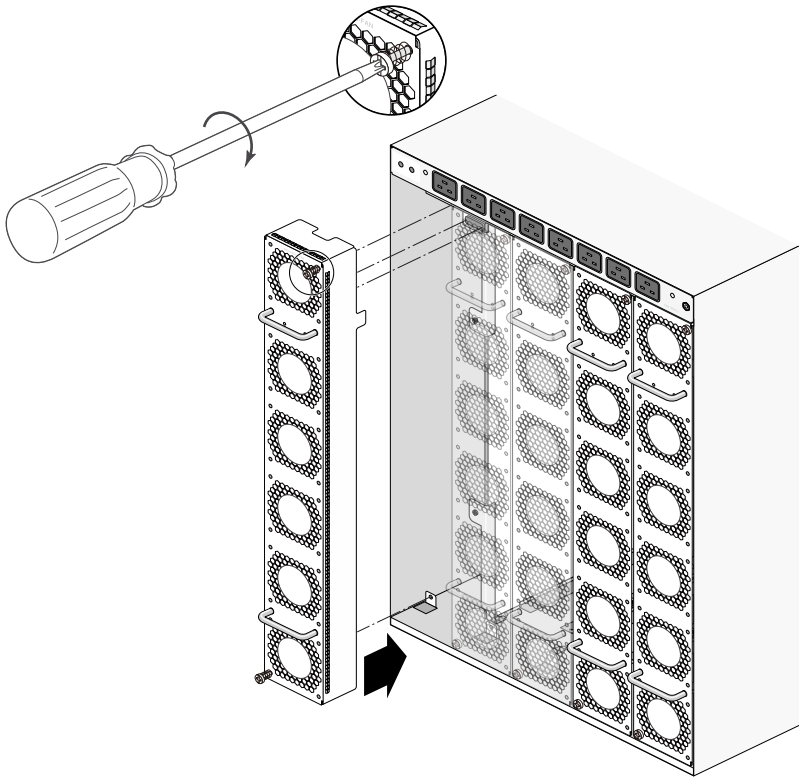

Figure 53: Installing a Fan Tray

Replacing a Management Module

You need the following tools and equipment to replace a management module:

- ESD-preventive wrist strap
- #2 Phillips screwdriver
- Module blank panel if you are not replacing the module

1 Attach the ESD-preventive wrist strap to your bare wrist.
2 If it is not already connected, connect the metal end to the receptacle between the management module slots.
3 Disconnect network cables from the front of the module.

4 On the injector/ejector lever, turn the captive screw counter-clockwise until the yellow band around the screw head of is completely visible.

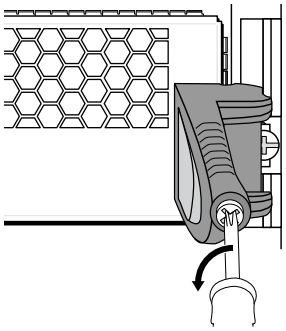

Figure 54: Unlocking a Module

5 Squeeze the release latch on the injector/ejector handle and rotate the handle to the right (away from the module) to unseat the module from the internal connectors.

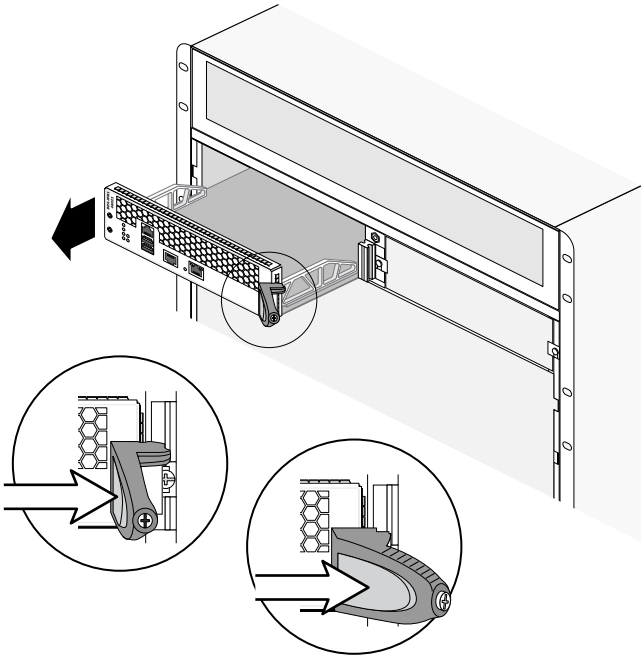

Figure 55: Removing a Management Module

6 Slide the module out of the chassis slot.

7 Immediately place the module into an anti-static bag to protect it from potential ESD damage.

The bag will also prevent dust from collecting on the module connectors.

8 If you are not going to install a replacement module, install a blank front panel. For more information, see Installing a Management Module Blank on page 60.

Installing a Management Module

Replace an old management module with a new one.

1 Holding the module by the metal rail and front panel only, remove the module from the antistatic packaging.

> **Caution**
>
> To prevent ESD damage, never touch the components on the PCB or the pins on any of the connectors.

2 Verify that the injector/ejector handle is in the open position.

Keep the injector/ejector handle in the open position as you slide the module into the chassis slot.

3 Carefully slide the module into the slot until the injector/ejector handle engages the edge of the chassis and begins to rotate toward the module.

4 Use the lever to fully seat the internal module connectors.

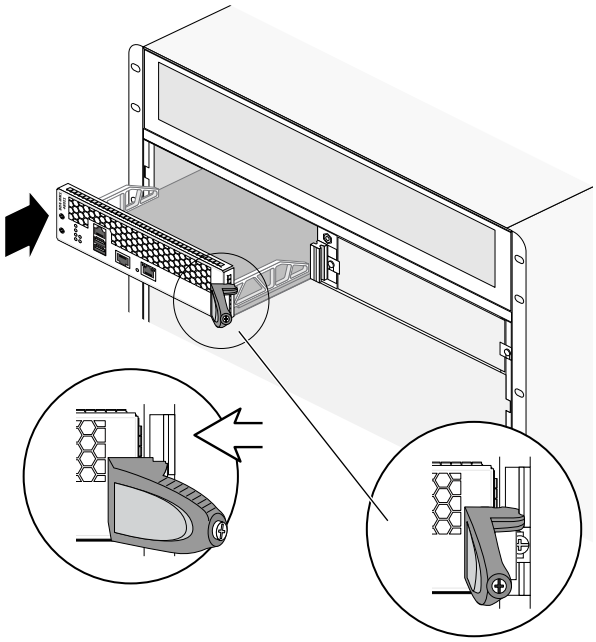

Figure 56: Installing a Management Module

5 Use a # 2 Phillips screwdriver to lock the handle into place.

When the locking screw is fully tightened, the yellow band around the screw head is completely hidden.

Caution

Be careful to avoid over-torquing and stripping the screw head.

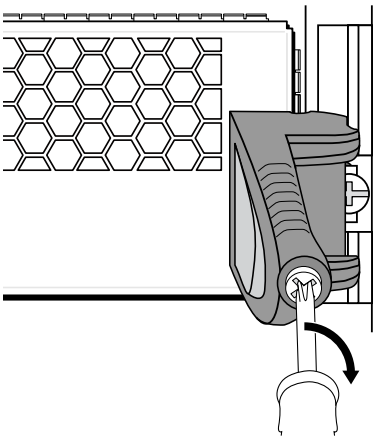

Figure 57: Locking the Module into Place

Installing a Management Module Blank

Install a blank management module in every unoccupied management slot.

If a management module is not installed in a slot, you must install a blank cover over the slot to maintain proper EMI levels and ventilation to ensure conformance to FCC requirements as well as to maintain adequate airflow through the switch.

1 Set the blank in place over the open slot.
2 Align and tighten the captive retaining screws.

Removing an I/O Module

You need the following tools and equipment to remove an I/O module:

- ESD-preventive wrist strap
- #2 Phillips (cross-head) screwdriver
- Module blank panel if you are not replacing the module

1 Attach the ESD-preventive wrist strap to your bare wrist.
2 If it is not already connected, connect the metal end to the receptacle between the management module slots.
3 Disconnect network cables from the front of the module.

4 On each injector/ejector lever, turn the captive screw counter-clockwise until the yellow band around the screw head of is completely visible.

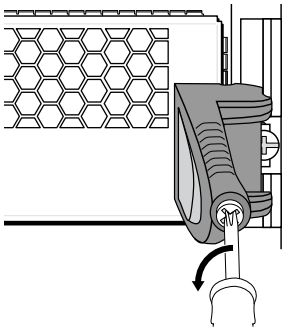

Figure 58: Unlocking a Module

5 Squeeze the release latch on each injector/ejector handle and rotate both handles outward to disconnect the internal module connectors.

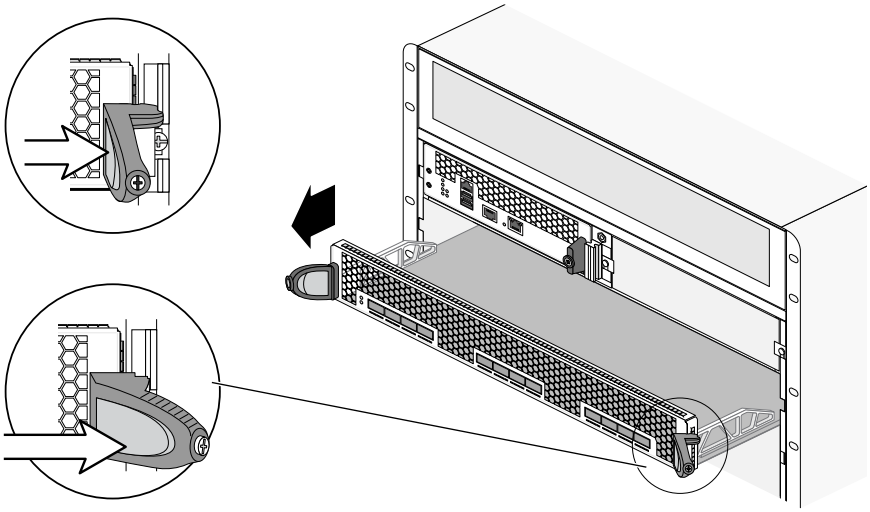

Figure 59: Removing an I/O Module

6 Slide the module out of the chassis slot.

7 Immediately place the module into an anti-static bag to protect it from potential ESD damage.

The bag will also prevent dust from collecting on the module connectors.

8 If you are not going to install a replacement module, install a blank front panel. See Installing I/O Module Blanks on page 62.

Installing an I/O Module

You need the following tools and equipment to install an I/O module:

- ESD-preventive wrist strap
- #2 Phillips screwdriver
- Module blank panel if you are not replacing the module

Slots for I/O modules are numbered 1 through 8, starting at the top.

Note

All unoccupied I/O module slots must be covered by I/O module blanks to ensure proper system ventilation and EMI compliance. Individual I/O module blanks are purchased separately from the chassis. See Installing I/O Module Blanks on page 86 to install I/O blanks.

1. Remove the shipping cover from the I/O module slots.

   The shipping cover maintains the mechanical stability of the chassis during shipping.
2. Keep the shipping cover and store it with the other chassis shipping materials, in case you need to move the chassis or return it to Extreme Networks.
3. Attach the ESD-preventive wrist strap to your bare wrist.
4. If it is not already connected, connect the metal end to the receptacle between the management module slots.
5. Holding the module by the metal rail and front panel only, remove the module from the antistatic packaging.

   Caution

   To prevent ESD damage, never touch the components on the PCB or the pins on any of the connectors.

6 Verify that the module injector/ejector handles are open. Keep the injector/ejector handles in the open position as you slide the module into the chassis slot.

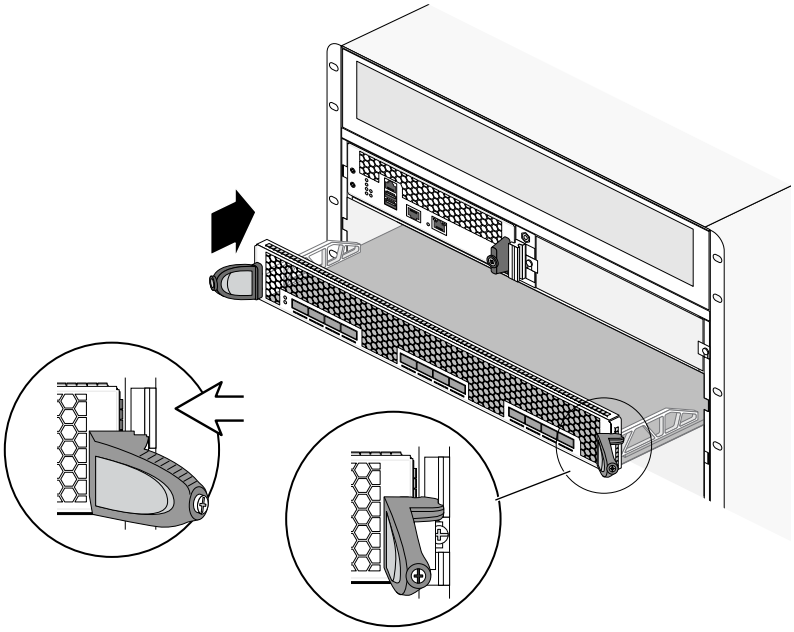

Figure 60: Installing an I/O Module

Note

If the injector/ejector handles are in the latched position, they prevent the module from sliding all the way into the slot.

7 Carefully slide the module into the slot until the injector/ejector handles engage the edges of the chassis and begin to rotate toward the center of the module.

8 Push the handles toward each other to seat the module internal connectors.

9 Use a # 2 Phillips screwdriver to lock each handle into place.

When a locking screw is fully tightened, the yellow band around the screw head is completely hidden.

Caution

Be careful to avoid over-torquing and stripping the screw heads.

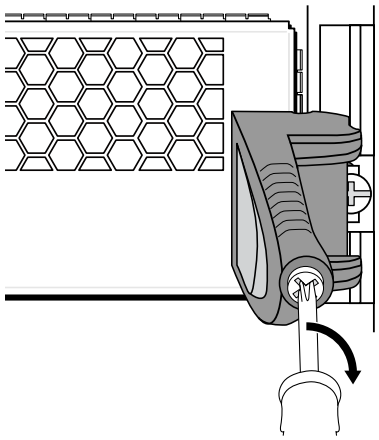

Figure 61: Locking the Module into Place

Installing I/O Module Blanks

Switches are shipped with a reinforcement shipping cover installed over all the I/O module slots. You need a #2 Phillips (cross-head) screwdriver to install a module blank. If you have the old I/O module blanks without thumb levers, see Installing I/O Module Blanks (Without Thumb Levers) on page 88.

After you have installed all the I/O modules for your system configuration, you must install module blanks in all remaining unoccupied slots.

Caution

All unoccupied slots in a BlackDiamond X8 series switch must have module blanks correctly installed to ensure conformance to FCC requirements as well as to maintain adequate airflow through the switch.

1 Verify that the I/O module blank injector/ejector handles are open.

Keep the injector/ejector handles in the open position as you slide the I/O module blank into the unoccupied chassis slot.

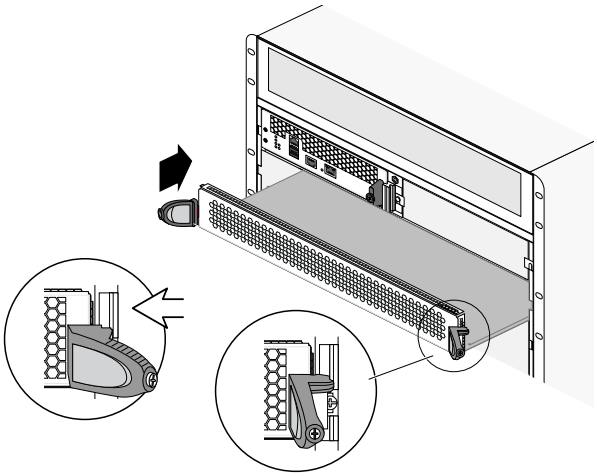

Figure 62: Installing an I/O Module Blank

Note

If the injector/ejector handles are in the latched position, they prevent the I/O module blank from sliding all the way into the slot.

2 Carefully slide the I/O module blank into the slot until the injector/ejector handles engage the edges of the chassis and begin to rotate toward the center of the module.

3 Push the handles toward each other to seat the I/O module blank.

4 Use a # 2 Phillips (cross-head) screwdriver to lock each handle into place.

When a locking screw is fully tightened, the yellow band around the screw head is completely hidden.

Caution

Be careful to avoid over-torquing and stripping the screw heads.

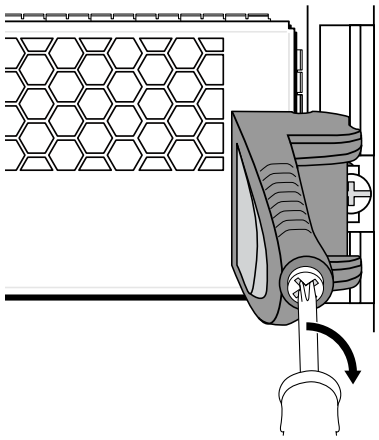

Figure 63: Locking the I/O module blank into place

Installing I/O Module Blanks (Without Thumb Levers)

Some of the older BDX chassis were shipped with module blanks without thumb levers. Use the following procedure if you have these older module blanks. If you have the newer I/O blanks with thumb levers, seeInstalling I/O Module Blanks on page 86.

After you have installed all the I/O modules for your system configuration, you must install module blanks in all remaining unoccupied slots.

Caution

All unoccupied slots in a BlackDiamond X8 series switch must have module blanks correctly installed to ensure conformance to FCC requirements as well as to maintain adequate airflow through the switch.

1 Check the condition of the EMI gaskets along the front panel edges of the blank, and confirm that the gaskets are not damaged.

2 Align the module blank with the card guides for the open slot on the chassis.

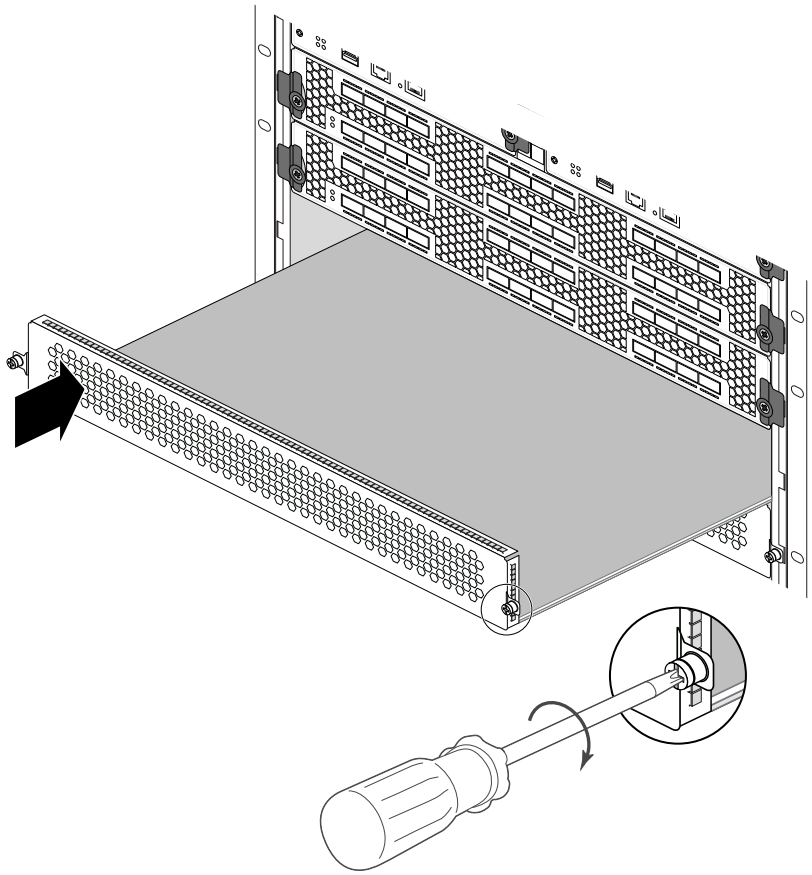

Figure 64: Installing a Module Blank without thumb levers

3 Use a #2 Phillips (cross-head) screwdriver to tighten the captive screws at each end of the module blank. Tighten the screws of each installed module blank before inserting additional modules or blanks.

Reseating a Management Module DIMM

If you need to reseat the DIMM, perform the following procedure:

1 Attach the ESD-preventive wrist strap to your bare wrist. If it is not already connected, connect the metal end to the receptacle between the management module slots.
2 Disconnect network cables from the front of the module.

3 On the injector/ejector lever, turn the captive screw counter-clockwise until the yellow band around the screw head of is completely visible.

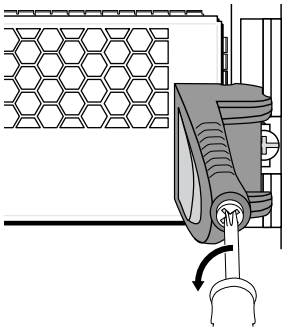

Figure 65: Unlocking a Module

4 Squeeze the release latch on the injector/ejector handle and rotate the handle to the right (away from the module) to unseat the module from the internal connectors.

Caution

To prevent ESD damage, hold the module by the metal rail and front panel only. Never touch the components on the PCB or the pins on any of the connectors except those components listed in this procedure.

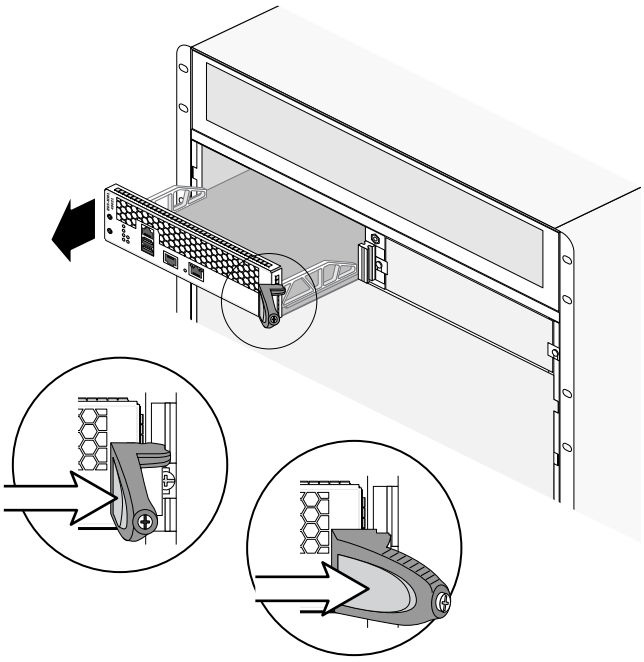

Figure 66: Removing a Management Module

5 Slide the module out of the chassis slot.

6 Place the module on an anti-static surface.

7 Locate the DIMM on the management module.

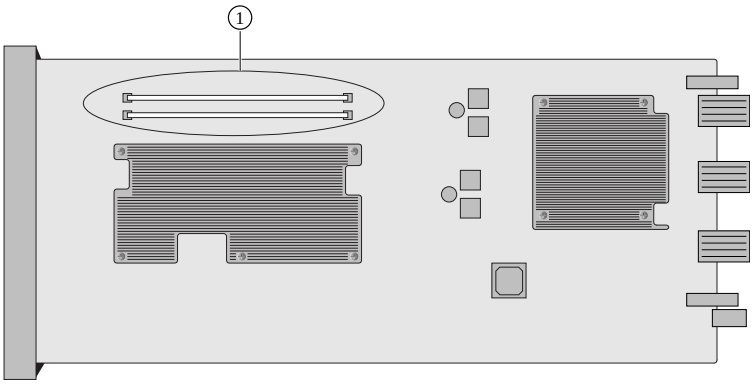

Figure 67: Locate the DIMM

1 = DIMMS

8 Remove any glue at the top of each latch with your fingers.

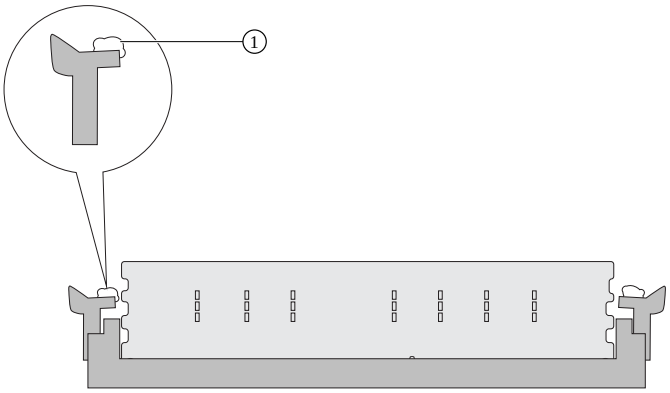

Figure 68: Glue on the top of the DIMM latch

1 = Glue

9 Unlock the DIMM and pull it perpendicularly straight up out of the socket. Do not twist or bend the DIMM while you are pulling it out.

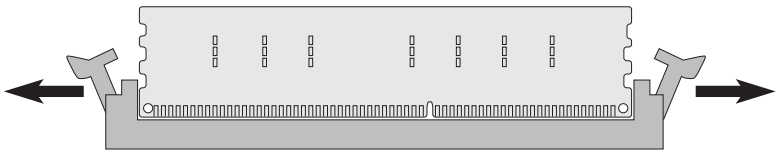

Figure 69: Unlock the latches on the DIMM

10 Reseat the DIMM into place, pushing it gently as far as it will go into the socket (there should be a clicking sound signifying the DIMM is fully seated). When it is fully seated the latches will lock back into place.

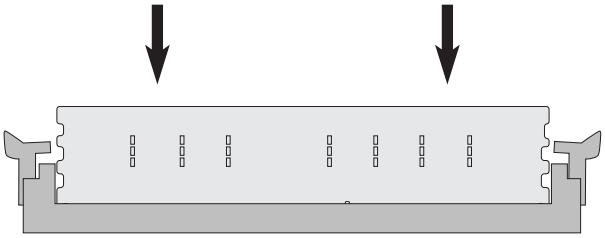

Figure 70: Push to reseat the DIMM

Caution
To avoid damage, the DIMM is polarized and will not go in the socket when rotated in the wrong direction.

11 Repeat steps 6 through 9 for the second DIMM.

Packing the Chassis for Shipping

Prepare, remove, and assemble the shipping box for returning the chassis.

You need the following tools and materials to pack a chassis:

- Original shipping cover for the front module slots
- Lifting handles that were shipped with the chassis
- Original shipping box and packing materials
- Screwdriver for ground lug screws
- Four rack-mounting screws for attaching the support brackets to the rack (if they have been removed)
- #2 Phillips screwdriver for removing the chassis from the rack
- Nylon package strapping material and a crimping tool

Perform the following steps to pack the chassiss for shipping:

1 Set the pallet in a convenient, stable location near the equipment rack.
2 Prepare the chassis for removal.
3 Remove the chassis from the rack.
4 Assemble the shipping container.

Preparing the Chassis for Removal

To prepare the chassis for removal from the rack, remove the installed modular components.

1 Turn off the power to the chassis and remove the installed power supplies.
   a Remove the power cord retainer and disconnect all power cords.
   b Remove all the installed power supplies.

2 Remove all the fan trays one at a time.
   a Completely loosen the retaining screws at the top and bottom of the fan tray.
   b Holding both handles, pull straight outward on the fan tray to disconnect the internal connector.
   c Set the fan tray aside in a safe place.

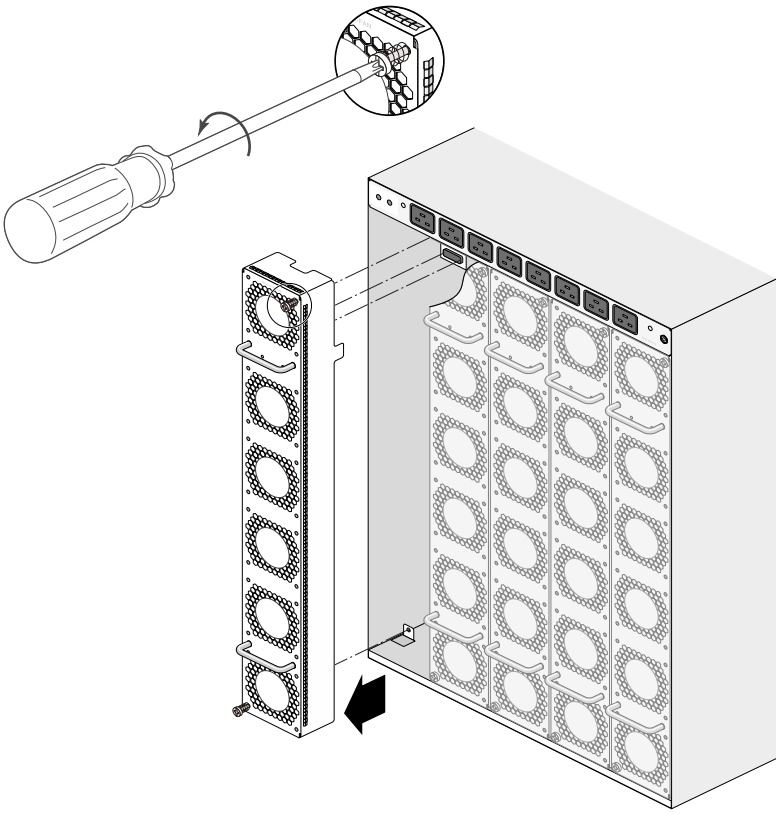

Figure 71: Removing the Fan Trays

3 Remove all the installed modules including any module blanks. For more information on removing modules, see:
   - Replacing a Management Module on page 79
   - Removing an I/O Module on page 82
   - Replacing a Fabric Module on page 73
4 At the front of the chassis, attach the shipping cover over the I/O module slots.

Removing the Chassis from the Rack

Once you have prepared for chassis removal, then remove the chassis from the rack.

1 On the back of the chassis, remove the screws from the ground lug to disconnect the ground wire from the chassis.
2 Using four mounting screws, attach the support brackets to the equipment rack immediately below the chassis.
3 Remove the rack mounting screws that secure the chassis to the rack.
4 Slowly guide the chassis out of the equipment rack using the support bracket for support.

5 Attach the lifting handles to each side of the chassis.
6 Carefully lift the chassis off the support bracket and lower it onto the wood pallet (see Setting the Chassis on the Shipping Pallet).
7 Re-install the removed fan trays:
   a Set each fan tray into the chassis and push it firmly into place.
   b Align and tighten the retaining screws.

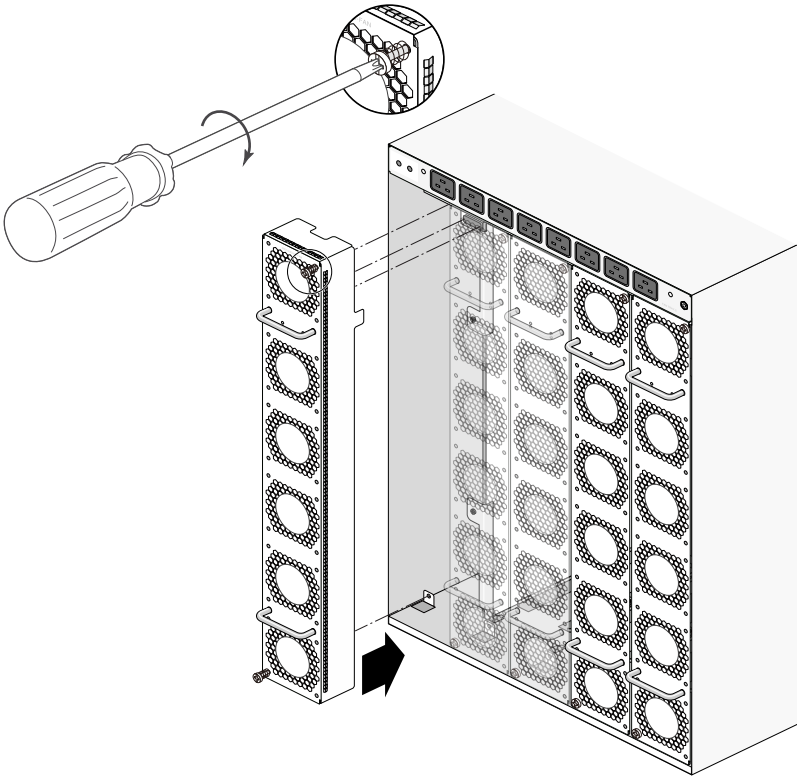

Figure 72: Installing a Fan Tray

Caution

Do not use the fan tray handles to lift or maneuver the chassis. The handles on the fan trays are not designed to support the weight of the chassis.

8 Remove the mid-mount brackets and lifting handles from the sides of the chassis.

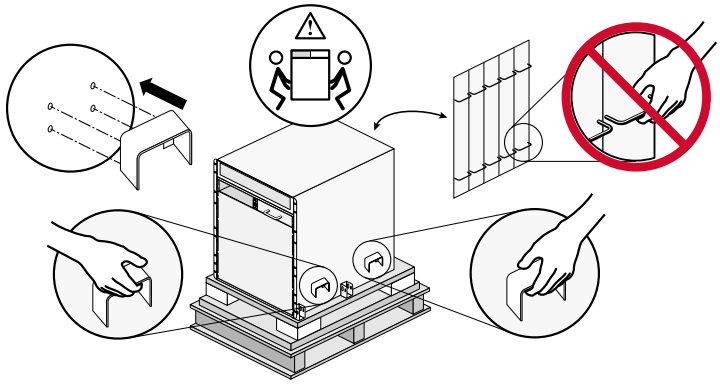

Figure 73: Setting the Chassis on the Shipping Pallet

Assembling the Shipping Container

Once the chassis is removed, assemble the shipping container around it.

1 At each corner, attach a restraining bolt to the shipping bracket, securing the chassis to the shipping pallet.

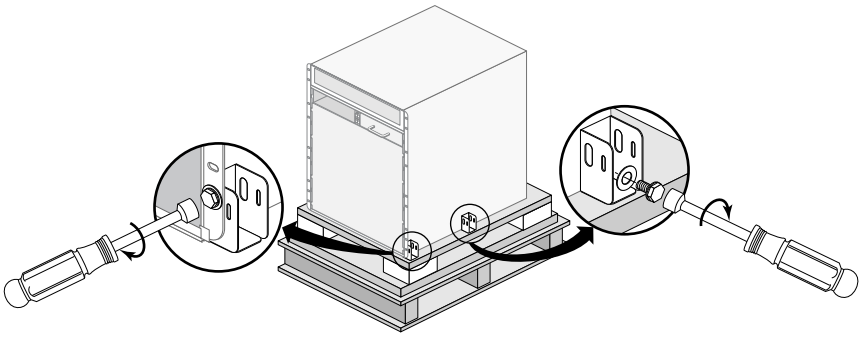

Figure 74: Recrating the BlackDiamond X8 Chassis

2 Put the lower foam cushion around the base of the chassis and set the upper foam cap on top of the chassis.

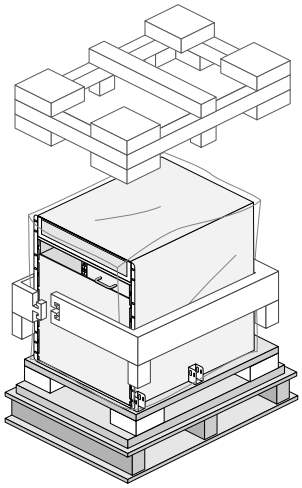

Figure 75: Placing the Foam Cushioning Around the Chassis

3 Set a corner brace at each corner of the chassis, and slide the shipping carton down over the chassis.

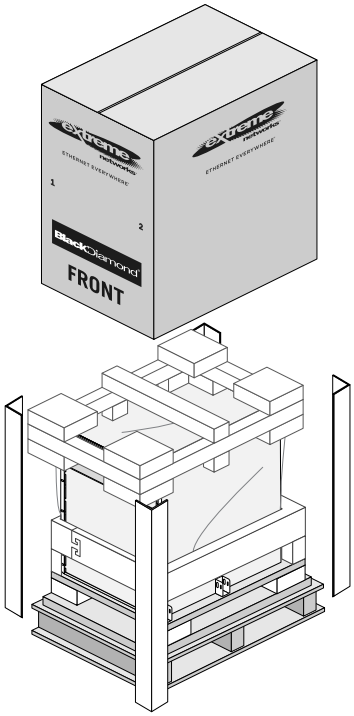

Figure 76: Placing the Shipping Carton over the Chassis

4 Secure the carton to the pallet using nylon strapping.

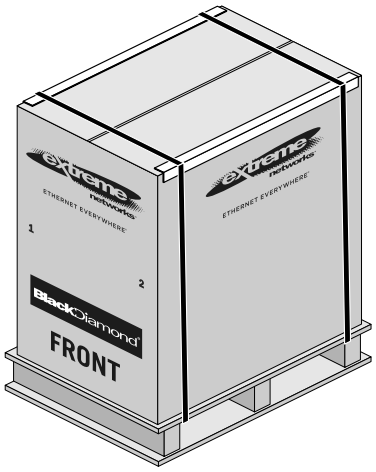

Figure 77: Shipping Carton with Nylon Straps

8 Safety Information

Considerations Before Installing
Maintenance Safety
General Safety Precautions
Cable Routing for LAN Systems
Installing Power Supply Units and Connecting Power
Selecting Power Supply Cords
Battery Replacement and Disposal
Fiber Optic Ports and Optical Safety
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Überlegungen vor der Installation
Allgemeine Sicherheitshinweise
Sicherheit bei Wartungsarbeiten
Kabelverlegung für LAN-Systeme
Installation der Netzteile und Netzanschluss
Auswahl der Netzkabel
Wechseln und Entsorgen der Batterie
LWL-Ports und optische Sicherheit

Only trained and qualified service personnel (as defined in IEC 60950-1) should install, replace, or perform service to Extreme Networks switches and their components.

Warning

Read all of the following safety information topics and sub-topics thoroughly before installing Extreme Networks products. Failure to follow this safety information can lead to personal injury or damage to the equipment.

Qualified personnel have read all related installation manuals, have the technical training and experience necessary to be aware of the hazards to which they are exposed in performing a task, and are aware of measures to minimize the danger to themselves or other persons.

If you are in the USA, install the system in accordance with the U.S. National Electrical Code (NEC).

Considerations Before Installing

Consider the following items before installing equipment.

- The system is designed to operate in a typical data center environment that is environmentally controlled. Choose a site that has the following characteristics:
  - Temperature- and humidity-controlled, such that the maximum ambient room temperature shall not exceed 40ºC (104ºF)
  - Clean and free from airborne materials.

  - Well ventilated and away from sources of heat including direct sunlight.
  - Away from sources of vibration or physical shock.
  - Isolated from strong electromagnetic fields produced by electrical devices.
  - Secured, enclosed, and restricted-access, ensuring that only trained and qualified service personnel have access to the equipment.
- Locate the system away from heat sources.
- Make sure that your equipment is placed in an area that accommodates the power consumption and component heat dissipation specifications.
- Make sure that your power supplies meet the site DC power or AC power requirements of all network equipment.
- Do not place a monitor or other objects on top of the equipment. The chassis cover is not designed to support weight.

Maintenance Safety

When you perform maintenance procedures on Extreme Networks equipment, follow these recommendations.

- Use only authorized accessories or components approved for use with this system. Failure to follow these instructions may damage the equipment or violate required safety and EMC regulations.
- This system contains no customer serviceable components. Do not attempt to repair a chassis, power supply, module, or other component. In the event of failure, return the defective unit to Extreme Networks for repair or replacement, unless otherwise instructed by an Extreme Networks representative.
- To remove power from the system, you must unplug all power cords from wall outlets. The power cord is the disconnect device to the main power source.
- Disconnect all power cords before working near power supplies, unless otherwise instructed by a product-specific maintenance procedure.
- When you handle modules, optic devices, power supplies, or other modular accessories put on an ESD-preventive wrist strap to reduce the risk of ESD-induced damage to the equipment. Connect the other end of the strap to an appropriate grounding point on the equipment rack. or to an ESD connector on the chassis, if one is provided. You may leave the ESD-preventive wrist strap permanently attached so that it is always available when you need to handle ESD-sensitive components.
- Install all cables in a manner that avoids strain. Use tie wraps or other strain relief devices.
- Replace a power cord immediately if it shows any signs of damage.

General Safety Precautions

Follow safety guidelines to avoid injury.

- Do not attempt to lift objects that you think are too heavy for you.
- When you install equipment in a rack, load heavier devices in the lower half of the rack first to avoid making the rack top-heavy.

- Only use tools and equipment that are in perfect condition. Do not use equipment with visible damage.
- Route cables in a manner that prevents possible damage to the cables and avoids causing accidents, such as tripping.

Cable Routing for LAN Systems

Extreme Networks equipment meets the requirements for LAN system equipment.

LAN systems are designed for intra-building installations; that is, cable runs between devices must be in the same building as the connected units, except under the conditions listed in the next paragraph.

As allowed in the USA by the National Electrical Code (NEC), this equipment can be connected between buildings if any one of the following conditions is true:

- Cable runs between buildings are less than 140 feet long.
- Cable runs between buildings are directly buried.
- Cable runs between buildings are in an underground conduit, where a continuous metallic cable shield or a continuous metallic conduit containing the cable is bonded to each building grounding electrode system.

Caution

Failure to follow these requirements for cable routing conditions may expose the user to electrical shock and expose the unit to damage that can cause errors.

Warning

The copper Ethernet ports of the equipment and its sub-assemblies are suitable only for intra-building connections (within the same building) or for connections to unexposed wiring or cabling. (See the conditions listed above.) The copper Ethernet ports of this equipment or its sub-assemblies must not be metallically connected to interfaces that connect to the outside plant (OSP) or its wiring. Copper Ethernet interfaces are designed for use only as intra-building interfaces (described as Type 2 or Type 4 ports in GR-1089-CORE, Issue 6) and require isolation from the exposed OSP wiring. The addition of Primary Protectors is not sufficient protection to connect these interfaces metallically to OSP wiring.

Installing Power Supply Units and Connecting Power

Check the ratings and power requirements of each power supply unit or router.

For the ratings and power requirements of each power supply unit, see Technical Specifications on page 111 of this guide or the data sheet for the power supply at: www.extremenetworks.com

Warning

Be sure to satisfy the requirements listed in this section when you install Extreme Networks power supplies.

When you install any power supply:

- Do not use excessive force when you insert a power supply into the bay.

- Do not attempt to open the power supply enclosure for any reason; the power supply does not contain user-serviceable parts. In the event of failure, return the defective power supply to Extreme Networks for repair or replacement.
- Do not put your hand into an open power supply bay when a power supply is not present.

When you install AC power supplies:

- Do not connect the power supply to an electrical source when the power supply is not installed in the BlackDiamond X8; doing so would expose a hazardous energy and poses a potential shock and fire hazard.
- Plug power supplies only into properly grounded electrical outlets to prevent electrical shock and to comply with international safety standards.
- Use only power cords that are certified for use within the country of use. Do not attempt to modify AC power cords.
- Make sure that the voltage and frequency of your power source match the system electrical ratings for the equipment. The building and/or power source must provide overload protection.
- Use a line conditioner, or uninterruptible power supply to protect the system from momentary increases or decreases in electrical power.
- Connect half of the power supplies to one power source. Connect the others to a separate independent power source.

  If a power source fails, it will affect only the power supplies to which it is connected. If all BlackDiamond X8 power supplies are connected to a single power source, the entire chassis is vulnerable to a power source failure.
- Extreme Networks AC power supplies do not have switches for turning the unit on and off. Disconnect all AC power cords to remove power from the BlackDiamond X8 Chassis. Make sure that these connections are easily accessible.

Selecting Power Supply Cords

Extreme Networks does not provide power input cords in the product box.

To purchase a power cord for your product and for your specific country, contact your local Extreme Networks Channel Account Manager or Sales Manager, or purchase a cord from your local supplier. Requirements for the power cord are listed in Technical Specifications on page 111.

To locate a Sales Manager or Partner in your region visit: http://www.extremenetworks.com/how-to-buy/how-to-buy.aspx

Caution

This equipment is not intended to be directly powered by power distribution systems where phase-phase voltages exceed 240VAC (2P+PE), such as those used in Norway, France, and other countries. For these applications it is recommended that a transformer be used to step down the voltage to < 240VAC from phase-phase, or that you make a connection to a (P+N +PE) power distribution where voltages do not exceed 240VAC. All installations should confirm that the product is reliably grounded according to the country's local electrical codes.

Battery Replacement and Disposal

Batteries included with Extreme products are encapsulated and must be replaced only by qualified Extreme Service personnel.

1 Contact your Extreme Networks Service personnel for product replacement.
2 Do not attempt to replace the battery.

Caution

If these instructions are disregarded and replacement of these batteries is attempted, the following guidelines must be followed to avoid danger of explosion:

a Replace with the same or equivalent battery type as recommended by the battery manufacturer.
b Dispose of the battery in accordance with the battery manufacturer's recommendation.

Fiber Optic Ports and Optical Safety

The following safety warnings apply to all optical devices used in Extreme Networks equipment that are removable or directly installed in an I/O module or chassis system.

Such devices include but are not limited to gigabit interface converters (GBICs), small form factor pluggable (SFP) modules (or mini-GBICs), QSFP+ modules, XENPAK transceivers, and XFP laser optic modules.

Caution

Laser optic modules become very hot after prolonged use. Take care when removing a laser optic module from the module or option card. If the laser optic module is too hot to touch, disengage the laser optic module and allow it to cool before removing it completely.

When working with laser optic modules, always take the precautions listed below to avoid exposure to hazardous radiation.

Caution

- Never look at the transmit LED/laser through a magnifying device while the transmit LED is powered on.
- Never look directly at a fiber port on the switch or at the ends of a fiber cable when they are powered on.
- Invisible laser radiation can occur when the connectors are open. Avoid direct eye exposure to the beam when optical connections are unplugged.
- Never alter, modify, or change an optical device in any way other than suggested in this document.

Note

Extreme Networks optical modules are tested to work in all supported Extreme Networks switches. We recommend that all customers use Extreme Networks optical modules in their Extreme Networks switches. Extreme Networks assumes no liability for third-party optical modules. Although Extreme Networks does not block third-party optical modules, we cannot ensure that all third-party optical modules operate properly in all Extreme Networks switches. The customer assumes all risks associated with using third-party optical modules in Extreme Networks switches.

GBIC, SFP (Mini-GBIC), QSFP+, XENPAK, and XFP Regulatory Compliance

Extreme Networks pluggable optical modules and direct-attach cables meet the following regulatory requirements:

- Class 1 or Class 1M Laser Product
- EN60825-1:2007 2nd Ed. or later, European standard
- FCC 21 CFR Chapter 1, Subchapter J in accordance with FDA & CDRH requirements
- Application of CE Mark in accordance with 2004/108/EEC EMC Directive, the 2006/95/EC Low Voltage Directives
- UL and/or CSA registered component for North America
- 47 CFR Part 15, Class A when installed into Extreme products

Sicherheitshinweise

Lesen Sie die folgenden Sicherheitshinweise aufmerksam durch, ehe Sie Extreme Networks-Produkte installieren.

Eine Missachtung dieser Sicherheitshinweise kann zu Verletzungen oder zu einer Beschädigung des/r Geräte/s führen.

Extreme Networks-Geräte und deren Komponenten dürfen nur durch geschulte und qualifizierte Wartungstechniker (wie in IEC 60950-1 und AS/NZS 3260 definiert) installiert, ausgetauscht oder gewartet werden. Dieses qualifizierte Personal muss den Inhalt aller zugehörigen Installationsanleitungen kennen sowie über die technische Ausbildung und Erfahrung verfügen, um die Gefahren, die mit der Ausführung einer Aufgabe assoziiert sind, zu kennen und zu wissen, wie sie diese Gefahren für sich selbst und Dritte minimieren können.

In den USA muss das System gemäß dem US National Electrical Code (NEC) installiert werden.

Überlegungen vor der Installation

Berücksichtigen Sie vor der Installation der Geräte folgende Punkte.

- Wählen Sie für Geräte, die in einer typischen Telekommunikationsumgebung mit kontrollierten Umweltbedingungen eingesetzt werden, einen Ort mit folgenden Merkmalen:
  - Temperatur und Feuchtigkeit werden kontrolliert, und die maximale Raumtemperatur liegt nicht über 40 ºC.
  - Sauber und frei von in der Luft enthaltenen Stoffen, die Elektrizität übertragen können.
  - Gut belüftet und fern von Wärmequellen inklusive direkter Sonneneinstrahlung.
  - Fern von Quellen für Erschütterungen oder mechanische Einwirkungen.
  - Getrennt von starken elektromagnetischen Feldern, die von elektrischen Geräten erzeugt werden.
- Bei Geräten, die nicht für eine Installation in Umgebungen mit kontrollieren Umweltbedingungen vorgesehen sind, wie z. B. Gehäuse im Freien, beachten Sie bitte das Produktdatenblatt oder Anhang B dieser Anleitung mit den Spezifikationen für Umgebungsbedingungen, Temperatur und Feuchtigkeit.
- Lassen Sie auf allen Seiten mindestens 3 Zoll Platz, um eine ausreichende Luftzirkulation zu gewährleisten. Die Lüftungsschlitze an der Vorder- oder Rückseite und an den Seiten dürfen nicht blockiert werden. Stellen Sie das System nicht in der Nähe von Wärmequellen auf.
- Versichern Sie sich, dass Ihre Geräte in einem Bereich aufgestellt werden, der für den Stromverbrauch und die damit verbundene Wärmestrahlung der Komponenten geeignet ist.
- Versichern Sie sich, dass Ihre Netzteile den Gleichstrom- bzw. Wechselstrombedarf aller Netzwerkgeräte decken können.
- Racks für Extreme Networks-Geräte müssen fest am Boden verankert werden. Bei nicht vorschriftsmäßiger Fixierung des Racks besteht die Gefahr, dass das Rack bei Wartungsarbeiten umkippt.
- Voraussetzung für den Betrieb des Systems ist die vollständige Anbringung aller Module, Blenden, Frontabdeckungen und rückseitigen Abdeckungen. Blenden und Abdeckplatten erfüllen folgende Funktionen:
  - Schutz vor gefährlich hohen Spannungen und Strömen im Inneren des Gerätes
  - Eindämmung von elektromagnetischen Interferenzen (EMI), die andere Geräte stören könnten

  - Vorgabe der Luftströmungsrichtung durch das Gerät
- Bei der Entsorgung des Gerätes sind alle nationalen Gesetze und Vorschriften zu beachten.

Allgemeine Sicherheitshinweise

Befolgen Sie die Richtlinien.

- Heben Sie keine Gegenstände, die zu schwer für Sie sind.
- Bei der Installation von Geräten in einem Rack platzieren Sie die schwereren Geräte in der unteren Hälfte, damit das Rack nicht kopflastig wird.
- Verwenden Sie nur Werkzeuge und Geräte, die sich in einem einwandfreien Zustand befinden. Werkzeuge, die sichtbar beschädigt sind, dürfen nicht benutzt werden.
- Achten Sie bei der Verlegung von Kabeln darauf, mögliche Beschädigungen der Kabel zu vermeiden und Risiken, z. B. Stolpergefahren, auszuschalten.
- Stellen Sie keinen Bildschirm oder anderen Gegenstände auf die Geräte. Die Chassisabdeckung ist keine Abstellfläche.
- Zum Schutz vor Selbstentzündung verwenden Sie nur Datenübertragungskabel der Größe 26 AWG oder größer. Verwenden Sie nur Kupferleiter.
- Arbeiten Sie während eines Gewitters nicht an dem System und stecken Sie keine Kabel an oder ab.
- Das Gerät muss geerdet werden. Der Schutzleiter darf nicht manipuliert oder umgangen werden und das Gerät darf auf keinen Fall ohne einen entsprechend installierten Schutzleiter betrieben werden.

Sicherheit bei Wartungsarbeiten

Befolgen Sie bei allen Wartungsarbeiten an Extreme Networks-Geräten folgende Empfehlungen.

- Verwenden Sie nur zugelassene Zubehörteile oder Komponenten, die für den Einsatz mit diesem System genehmigt sind. Eine Missachtung dieser Hinweise kann zu einer Beschädigung des/r Geräte/s führen und die einschlägigen Sicherheits- und EMV-Vorschriften verletzen.
- Das System enthält keinerlei Teile, die vom Benutzer zu warten sind. Versuchen Sie nicht, Chassis, Netzteil, Modul oder andere Komponenten eigenmächtig zu reparieren. Senden Sie im Falle einer Störung das defekte Teil zur Reparatur oder zum Austausch an Extreme Networks ein, sofern ein Extreme Networks-Vertreter nicht etwas anderes angibt.
- Um das System spannungslos zu machen, müssen Sie alle Netzkabel aus den Netzsteckdosen ziehen. Das Netzkabel ist der "Trennschalter" für die Netzspannungsquelle.
- Trennen Sie vor allen Arbeiten in der unmittelbaren Nähe von Netzteilen alle Netzkabel von der Spannungsquelle, sofern die produktspezifische Wartungsanleitung nicht etwas anderes angibt.
- Legen Sie für alle Arbeiten an optischen Geräten, Netzteilen oder sonstigen modularen Zubehörteilen ein geerdetes Massearmband an, um das Risiko einer Beschädigung des Gerätes durch elektrostatische Aufladung zu reduzieren. Schließen Sie das eine Ende des Armbands an einem geeigneten Erdungspunkt am Rack oder an einer ESD-Buchse am Chassis (sofern vorhanden) an. Lassen Sie das geerdete Massearmband am Rack oder am Chassis angeschlossen, damit Sie es jederzeit parat haben, wenn Sie mit Komponenten umgehen, die empfindlich gegenüber elektrostatischer Aufladung sind.
- Die Kabel sind spannungsfrei zu installieren. Verwenden Sie Kabelbinder oder sonstige Zugentlastungsvorrichtungen.

Kabelverlegung für LAN-Systeme

Extreme Networks-Geräte erfüllen die Anforderungen für Geräte für LAN-Systeme.

LAN-Systeme sind für gebäudeinterne Installationen konzipiert, das heißt, die Kabel zwischen den einzelnen Einheiten müssen im gleichen Gebäude verlaufen, in dem auch die Geräte untergebracht. Hiervon ausgenommen sind nur die unten aufgeführten Bedingungen.

Laut dem US-amerikanischen National Electrical Code (NEC) darf diese Ausrüstung zwischen Gebäuden verbunden werden, sofern eine der folgenden Bedingungen erfüllt ist:

- Die Länge der zwischen Gebäuden verlegten Kabel beträgt höchsten 140 Fuß.
- Die Kabel sind zwischen den Gebäuden direkt erdverlegt.
- Die Kabel zwischen den Gebäuden sind in einem unterirdischen Kanal verlegt, wobei ein durchgehender metallischer Kabelschirm oder eine durchgehende Metallleitung, die das Kabel umschließt, an den Erdungselektrodensystemen der einzelnen Gebäude angeschlossen ist.

Caution

Eine Missachtung dieser Bedingungen für die Kabelverlegung kann Nutzer der Gefahr eines elektrischen Stromschlages aussetzen und das Gerät so beschädigen, dass es nicht mehr einwandfrei arbeitet.

Die Ethernet-Anschlüsse des Gerätes und der zugehörigen Baugruppen sind nur für gebäudeinterne (innerhalb ein und desselben Gebäudes) Verbindungen oder für Anschlüsse an nicht exponierte Verdrahtungen oder Verkabelungen geeignet (siehe die oben aufgeführten Bedingungen). Die Ethernet-Anschlüsse des Gerätes und der zugehörigen Baugruppen dürfen nicht mit Metallkontakt an Schnittstellen angeschlossen werden, die mit einer externen Anlage (Outside Plant, OSP) oder deren Verdrahtung verbunden sind. Ethernet-Schnittstellen sind nur für eine Verwendung als gebäudeinterne Schnittstellen konzipiert (sog. Ports vom Typ 2 oder Typ 4 gemäß GR-1089-CORE, Ausgabe 6) und müssen durch Isolierung von exponierter OSP-Verdrahtung getrennt werden. Primäre Protektoren sind kein ausreichender Schutz für den Anschluss dieser Schnittstellen über einen Metallkontakt mit OSP-Verdrahtung.

Diese Warnung gilt nicht für Ports vom Typ T1/E1, weil diese Ports über eine integrierte Isolierung und einen Schutz vor Spannungsspitzen verfügen, der den Anschluss an OSP-Verdrahtung gestattet.

Installation der Netzteile und Netzanschluss

Die Leistungsdaten und die Anforderung der einzelnen Netzteile an den Leistungseingang entnehmen Sie bitte Anhang B dieser Anleitung oder dem Datenblatt für die Netzversorgung unter http://www.extremenetworks.com.

Die Leistungsdaten und die Anforderung der einzelnen Netzteile an den Leistungseingang entnehmen Sie bitte Anhang B dieser Anleitung oder dem Datenblatt für die Netzversorgung unter http://www.extremenetworks.com.

Warning

Die in diesem Abschnitt aufgeführten Anforderungen müssen bei der Installation von Extreme Networks-Netzteilen und beim Netzanschluss unbedingt erfüllt werden.

Bei Installation eines Netzteils:

- Schieben Sie das Netzteil nicht mit Gewalt in den Einschub.
- Versuchen Sie nicht, das Gehäuse des Netzteils zu öffnen; das Netzteil enthält keinerlei Teile, die vom Nutzer zu warten sind. Senden Sie im Falle einer Störung das defekte Netzteil zur Reparatur oder zum Austausch an Extreme Networks ein.
- Fassen Sie nicht mit der Hand in einen offenen Netzteileinschub, wenn das Netzteil entfernt wurde.
- Legen Sie vor allen Arbeiten an einem an Leistungskabeln angeschlossenen Gerät sämtlichen Schmuck sowie Ihre Armbanduhr ab. Im Falle eines Kurzschlusses (Kontakt mit Leistung und Erde) erwärmen sich Metallgegenstände, was zu ernsthaften Verbrennungen führen oder den Metallgegenstand mit den Anschlüssen verschweißen kann.
- Legen Sie vor allen Arbeiten an einem an Leistungskabeln angeschlossenen Gerät sämtlichen Schmuck sowie Ihre Armbanduhr ab. Metallgegenstände erwärmen sich, wenn sie an Leistung und an Erde angeschlossen werden, was zu ernsthaften Verbrennungen führen oder den Metallgegenstand mit den Anschlüssen verschweißen kann.
- Wenn das Netz bei angeschlossener Netzversorgung angeschlossen oder getrennt wird, kann ein elektrischer Lichtbogen entstehen. Dies kann bei Installationen in Gefahrenbereichen zu einer Explosion führen. Achten Sie unbedingt darauf, dass das Gerät nicht mit der Netzversorgung verbunden ist.
- Achten Sie bei der Installation oder beim Austausch von Geräten darauf, dass Sie zuerst den Erdungsanschluss herstellen bzw. den Erdungsanschluss zuletzt trennen.

Bei Installation von AC-Netzteilen:

- Schließen Sie bei Switches mit einem vor Ort austauschbaren Netzteil die Spannungsversorgung nicht an einer elektrischen Spannungsquelle an, wenn das Netzteil nicht im Switch eingebaut ist; andernfalls kann gefährliche Energie freigesetzt werden und es besteht potenzielle Stromschlag- und Brandgefahr.
- Stecken Sie Netzteile nur an vorschriftsmäßig geerdete Netzsteckdosen an, um die Gefahr eines elektrischen Stromschlages zu vermeiden und internationale Sicherheitsstandards zu erfüllen.
- Verwenden Sie nur Netzkabel, die in dem jeweiligen Einsatzland zugelassen sind. Versuchen Sie nicht, modifizierte AC-Netzkabel zu verwenden
- Versichern Sie sich, dass Spannung und Frequenz Ihrer Steckdose mit den elektrischen Daten Ihres Gerätes übereinstimmen. Das Gebäude und/oder die Spannungsquelle muss gegen Überlast geschützt sein.
- Verwenden Sie einen Überspannungsschutz, einen Netzfilter oder eine unterbrechungsfreie Spannungsversorgung, um das System plötzlichen Spannungsschwankungen zu schützen.
- Bei Systemen mit mehreren Netzteilen schließen Sie jedes Netzteil an einer anderen, unabhängigen Überstromschutzvorrichtung an, z. B. an einem Schütz. Bei Ausfall einer Spannungsquelle ist nur das daran angeschlossene Netzteil betroffen. Für die korrekte Auslegung des Schützes siehe das Datenblatt des Netzteils.
- AC-Netzteile von Extreme Networks haben keinen Ein-/Ausschalter. Trennen Sie alle Netzstecker von den elektrischen Steckdosen, um die Spannungsversorgung zu unterbrechen. Achten Sie auf gute Zugänglichkeit der Steckdosen.

Installation von DC-Netzteilen und Anschluss von Gleichspannung:

- Der Anschluss an die Gleichspannungsquelle Ihrer Einrichtung muss von einem qualifizierten, geprüften Elektriker vorgenommen werden.
- DC-Netzteile von Extreme Networks haben keinen Ein-/Ausschalter. Versichern Sie sich, dass der DC-Kreis spannungslos ist, ehe Sie das Gleichstromkabel an einer Gleichstromeingangsbuchse an- oder abstecken.
- Schließen Sie eine Gleichstromversorgung nicht an die DC-Quelle an, wenn das Netzteil nicht im Chassis eingebaut ist; andernfalls kann gefährliche Energie freigesetzt werden und es besteht potenzielle Stromschlag- und Brandgefahr.
- Schließen Sie das System oder das Netzteil nur an eine DC-Spannungsquelle an, die die Bestimmungen für Sicherheitskleinspannung (SELV) in den IEC 60950-basierten Sicherheitsstandards erfüllt.
- DC-Geräte müssen in einem zugangsbeschränkten Bereich installiert werden, damit gewährleistet ist, dass nur geschultes und qualifiziertes Wartungspersonal Zugang zu den Geräten hat. Ein zugangsbeschränkter Bereich kann beispielsweise nur mithilfe eines Spezialwerkzeugs, Schloss und Schlüssel oder einer anderen Sicherheitsvorrichtung geöffnet werden.

Note

Da die Gebäudevorschriften in aller Welt unterschiedlich sind, empfiehlt Extreme Networks dringend, sich bezüglich der korrekten Erdung und Spannungsverteilung für Ihre Installation in Ihrem Land an einen Elektrofachbetrieb zu wenden.

Auswahl der Netzkabel

Im Lieferumfang von Extreme Networks-Produkten sind keine Netzkabel enthalten.

Ein für Ihr Produkt und Land passendes Netzkabel erhalten Sie entweder von Ihrem zuständigen Extreme Networks Channel Account Manager oder Sales Manager oder im örtlichen Fachhandel. Die Anforderungen an das Netzkabel entnehmen Sie Anhang B zu dieser Anleitung.

Hier finden Sie Ihren zuständigen Sales Manager oder Fachhändler: http://www.extremenetworks.com/how-to-buy/how-to-buy.aspx

Note

Dieses Gerät ist nicht für eine direkte Versorgung von einem Spannungsverteilungssystem vorgesehen, wo die Leiter-Leiter-Spannung den Wert von 240 VAC (2 Phasen+Schutzerde), wie zum Beispiel in Norwegen, Frankreich und anderen Ländern. Für derartige Anwendungen wird ein Transformator empfohlen, um die Spannung auf einen Wert unter < 240 VAC (Leiter-Leiter) herunterzutransformieren oder ein Anschluss an eine (P+N+Schutzerde) Spannungsverteilung, wo die Spannung 240 VAC nicht überschreitet.

Alle Installationen müssen eine zuverlässige Erdung gemäß den nationalen Elektrovorschriften vorsehen.

Wechseln und Entsorgen der Batterie

Die Batterien in Extreme Produkten sind gekapselt und dürfen nur durch qualifiziertes Extreme-Wartungspersonal ausgewechselt werden.

1 Wenden Sie sich für den Austausch eines Produktes an das Wartungspersonal von Extreme Networks. Versuchen Sie nicht, die Batterie selbst auszuwechseln.
2 Bei einer Missachtung dieser Anweisungen und dem Versuch, die Batterien eigenmächtig zu wechseln, müssen folgende Richtlinien eingehalten werden, um eine mögliche Explosion zu vermeiden:
   a Tauschen Sie die Batterie nur gegen eine Batterie des gleichen Typs (wie vom Hersteller empfohlen) aus.
   b Entsorgen Sie die Batterie gemäß den Empfehlungen des Batterieherstellers.

LWL-Ports und optische Sicherheit

Folgende Sicherheitswarnung gilt für alle optischen Geräte, die in Extreme Networks-Geräten eingesetzt werden und entweder herausnehmbar sind oder direkt in einem E/A-Modul oder im Chassissystem eingebaut sind.

Folgende Sicherheitswarnung gilt für alle optischen Geräte, die in Extreme Networks-Geräten eingesetzt werden und entweder herausnehmbar sind oder direkt in einem E/A-Modul oder im Chassissystem eingebaut sind.

Solche Geräte sind nicht nur Gigabit-Interface-Konverter (GBICs), steckbare Kleinformfaktormodule (SFP) (oder Mini-GBICs), QSFP+ Module, XENPAK Sendeempfänger und laseroptische XFP-Module.

Warning

Laseroptische Module können bei längerem Gebrauch sehr heiß werden. Seien Sie beim Ausbau eines laseroptischen Moduls aus dem Modul oder der Optionskarte äußerst vorsichtig. Wenn das laseroptische Modul zum Anfassen zu heiß ist, trennen Sie das laseroptische Modul und lassen Sie es abkühlen, ehe Sie es komplett ausbauen.

Ergreifen Sie beim Arbeiten mit laseroptischen Modulen die nachfolgenden Vorsichtsmaßnahmen, um eine Aussetzung gegenüber gefährlicher Strahlung zu vermeiden.

- Blicken Sie auf keinen Fall durch ein Vergrößerungsglas in die Sendediode/den Laser, solange die Sendediode aktiv ist.
- Blicken Sie auf keinen Fall in den LWL-Port am Switch oder auf die Stirnflächen eines aktiven LWL-Kabels.
- Bei offenen Anschlüssen kann unsichtbare Laserstrahlung abgegeben werden. Vermeiden Sie eine direkte Aussetzung der Augen gegenüber dem Strahl, wenn die optischen Anschlüsse offen (ohne Stecker) sind.
- Optische Geräte dürfen auf keine andere Weise als in diesem Dokument empfohlen verändert, modifiziert oder umgebaut werden.

Konformität von GBIC, SFP (Mini-GBIC), QSFP+, XENPAK und XFP

Steckbare optische Module von Extreme Networks und direkt angeschlossene Kabel erfüllen folgende gesetzliche Vorschriften.

- Laserprodukt der Klasse 1 oder Klasse 1M
- EN60825-1:2007 2. Ausgabe oder später, Europäische Norm
- FCC 21 CFR Kapitel 1, Paragraph J in Übereinstimmung mit FDA- und CDRH-Bestimmungen

- Anwendung des CE-Zeichens gemäß der EMV-Richtlinie 2004/108/EEC und der Niederspannungsrichtlinie 2006/95/EC
- UL und/oder CSA-geprüfte Komponente für Nordamerika
- 47 CFR Teil 15, Klasse A bei Einbau in Extreme-Produkte

9 Technical Specifications

BlackDiamond X8 Switch
Modules for BlackDiamond X8 Switches
Power Supplies for BlackDiamond X8 Switches
Connector Pinouts
Conformity Statements for EMC Class A

The technical specification section contains the following topics:

- BlackDiamond X8 Switch on page 111
- Modules for BlackDiamond X8 Switches on page 113
- Power Supplies for BlackDiamond X8 Switches on page 115
- Connector Pinouts on page 115
- Conformity Statements for EMC Class A on page 117

BlackDiamond X8 Switch

Technical specifications.

BlackDiamond X8 Switch Technical Specifications

Table 13: Physical Characteristics

BlackDiamond X8 chassis	Height: 25 inches (63.5 cm) Width: 18 inches (45.7 cm) Depth: 30 inches (76.2 cm) Note: Handles on the fan trays add 1.25 inches (3.2 cm) to the depth of the chassis. Weight (empty): 187.4 lb (85 kg) Weight (with 5 fan trays): 218.4 lb (99.1 kg) Weight (fully loaded): 420.6 lb (190.6 kg)
BlackDiamond X8 fan tray	Height: 24 inches (60.9 cm) Width: 4 inches (10.1 cm) Depth: 3 inches (7.6 cm) Note: Handles add 1.25 inches (3.2 cm) to the depth of the fan tray. Weight: 6.2 lb (2.8 kg) Fan speed: 2,500-12,000 RPM ± 10%
Power input socket	IEC 320 C20
Power supply cord selection	Refer to Selecting Power Supply Cords.

Table 14: Safety Standards

North American	UL 60950-1:2007 2nd Ed. or UL 60950-1 1st Ed:2007 as applicable (US) cULus listed to CSA 22.2 No. 60950-1-07 (Canada) FCC 21 CFR 1040.10 (US Laser Safety) CDRH Letter of Approval (US FDA Approval)
European/International	CB Scheme, IEC 60950-1:2005, 2nd Ed. with national differences GS Mark, EN 60950-1:2006+A11 EN 60825-1:2007 (EU Laser Safety) 2006/95/EC Low Voltage Directive AS/NZS 60950-1 (Australia/New Zealand) Mexico, NOM-19 (NRTL) Russia (GOST-R)

Table 15: EMI/EMC Standards

North American	FCC CFR 47 part 15:2009 Class A (US) ICES-003 Issue 4:2004 Class A (Canada)
European	EN 55022:2006+A1:2007 Class A EN 55024:1998+A1:2001+A2:2003 EN50121-4:2006 EN/IEC 61000-3-2:2006+A2:2009 (Harmonics) EN/IEC 61000-3-3:2009 (Flicker) EN/IEC 61000-4-2 Ed 2.0:2008 Electrostatic Discharge, 8kV Contact, 15kV Air, Criteria A IEC/EN 61000-4-3 Ed 3.2:2010 Radiated Immunity, 80–1GHz 20V/m, 1000–2100 10V/m, 2100–2700 5V/m, Criteria A IEC/EN 61000-4-4 Ed 2.0:2010 Transient Burst, 2kV, Criteria A IEC/EN 61000-4-5 Ed 2.0:2010 Surge, 1/2kV, Criteria A IEC/EN 61000-4-6 Ed 3.0:2008 Conducted Immunity, 0.15-80MHz, 10V/rms, unmod., Criteria A IEC/EN 61000-4-11 Ed 2.0:2004 Power Dips & Interruptions, >30%, 25 periods, Criteria C 2004/108/EC EMC Directive
International	CISPR 22:2005+A1:2005 Class A (International Emissions) CISPR 24:1997_A1:2001+A2:2002 (International Immunity) VCCI, 2010-04, Class A (Japan) ACMA, AS/NZS CISPR22:2009 (Australia) KCC Mark, KN22, KN24 (Korea) BSMI, CNS 13438:1997 Class A (Taiwan) BSMI, CNS 14336-1:2010 Safety (Taiwan)

Table 16: Telecommunications

	EN/ETSI 300 386 v1.4.1:2008-04 (Emissions & Immunity) EN/ETSI 300 019-2-1 v2.1.2 - Class 1.2 Storage EN/ETSI 300 019-2-2 v2.1.2 - Class 2.3 Transportation EN/ETSI 300 019-2-3 v2.1.2 - Class 3.1e Operational EN/ETSI 300 753 (1997 - 10) - Acoustic Noise

Table 17: IEEE 802.3 Media Access Standards

Note: These standards are module-specific and may not apply to every module in the series.	IEEE 802.3 10BASE-T (management port only) IEEE 802.3u 100BASE-TX, 100BASE-FX (management port only) IEEE 802.3z 1000BASE-X IEEE 802.3ab 1000BASE-T IEEE 802.3ac VLAN Tag IEEE 802.3ad Link Aggregation IEEE 802.3ae 10GBASE-X

Table 18: Environmental Data

Operating conditions	Operating temperature range: 0° C to 40° C (32° F to 104° F) Operating humidity: 10% to 93% relative humidity, non-condensing Operational shock: 30 m/s^2 (3 g), 11 ms, 60 shocks Operational sine vibration: 5 to 100 to 5 Hz @ 0.2 g, 0 to peak, 0.1 oct./min. Operational random vibration: 3 to 500 Hz @ 1.5g rms ASTM D3580 random vibration unpackaged 1.5g NOTE: *Operating temperature* refers to the input air temperature in the environment and applies to all switch components. The show temperature CLI command displays the internal temperature of individual hardware components, as well as the allowable internal temperature range for each component.
Storage & transportation conditions (packaged)	Transportation temperature: –40° C to 70° C (–40° F to 158° F) Storage and transportation humidity: 10% to 93% relative humidity, non-condensing Packaged shock (half sine): <50 kg 180 m/s^2 (10 g), 6 ms, 600 shocks, modules>50 kg 100 m/s^2 (6 g), 11 ms, 600 shocks, chassis Packaged random vibration: 5 to 20 Hz @ 1.0 ASD w/–3 dB/oct. from 20 to 200 Hz 14 drops minimum on sides & corners @ 39.5" <22 lb (10 kg) modules @ 11.8" <110 lb (50 kg) chassis

Table 19: Acoustic Sound

Sound pressure for comparison to legacy standards	Low Speed: 60.3 dB(A) per ISO 7779:2010 Medium Speed: 66.0 dB(A) per ISO 7779:2010 High Speed: 82.3 dB(A) per ISO 7779:2010
Sound power in accordance with EN 300 753 v1.3.1 (2011-11)	Low Speed: 72.0 dB(A) per ISO 3744:1994 Medium Speed: 78.0 dB(A) per ISO 3744:1994 High Speed: 94.4 dB(A) per ISO 3744:2010
Declared sound power in accordance with EN 300 753 v1.3.1 (2011-11)	Low Speed: 7.5 B(A) in accordance with ISO 9296:1998 Medium Speed: 8.1 B(A) in accordance with ISO 9296:1998 High Speed: 9.7 B(A) in accordance with ISO 9296:1998

Modules for BlackDiamond X8 Switches

The following table contains the technical specifications for BlackDiamond X8 Series Modules.

Table 20: I/O Modules

Module	Specifications Note: Inserter/extractor levers add 2.25 inches (5.7 cm) to the depth measurement.
BDXA-10G48X	Length 18 inches by width 17 inches by height 2.3 inches (45.5 cm x 41.8 cm x 5.82 cm) Weight: 10.9 lb (4.9 kg) Packaged weight: 16.2 lb (7.3 kg) Power: 290 W (Heat Dissipation 990 BTU)
BDXA-40G24X	Length 18 inches by width 17 inches by height 2.3 inches (45.5 cm x 41.8 cm x 5.82 cm) Weight: 14.0 lb (6.3 kg) Packaged weight: 19.4 lb (8.8 kg) Power: 510 W (Heat Dissipation 1740 BTU)
BDXA-40G12X	Length 18 inches by width 17 inches by height 2.3 inches (45.5 cm x 41.8 cm x 5.82 cm) Weight: 11.0 lb (5.0 kg) Packaged weight: 16.4 lb (7.4 kg) Power: 265 W (Heat Dissipation 904 BTU)
BDXA-10G48T	Length 18 inches by width 17 inches by height 2.3 inches (45.5 cm x 41.8 cm x 5.82 cm) Weight: 11.1 lb (5.1 kg) Packaged weight: 16.1 lb (7.3 kg) Power: 435 W (Heat Dissipation 1,484 BTU)
Module blank	Length 18 inches by width 17 inches by height 2.3 inches (45.0 cm x 41.8 cm x 5.82 cm) Weight: 4.8 lb (2.2 kg) Packaged weight: 7.1 lb (3.2 kg)

Table 21: Management Module

Module	Specifications
BDXA-MM1	Length 18 inches by width 8 inches by height 2.3 inches (45.5 cm x 20.3 cm x 5.82 cm) Weight: 5.5 lb (2.5 kg) Packaged weight: 7.9 lb (3.5 kg) Power: 150 W (Heat Dissipation: 512 BTU)

Table 22: Fabric Modules

Module	Specifications
BDXA-FM10T	Length 21 inches by width 11 inches by height 4 inches (53.3 cm x 27.9 cm x 10.2 cm) Weight: 9.2 lb (4.2 kg) Packaged weight: 12.8 lb (5.8 kg) Power: 270 W (Heat Dissipation: 921 BTU)
BDXA-FM20T	Length 20 inches by width 10 inches by height 3 inches (50.8 cm x 25.4 cm x 7.60 cm) Weight: 9.2 lb (4.2 kg) Packaged weight: 12.8 lb (5.8 kg) Power: 330 W (Heat Dissipation: 1126 BTU)

Power Supplies for BlackDiamond X8 Switches

Table 23: Specifications for the BlackDiamond X8 AC Power Supply (Model # 48011)

Typical configuration	three power supplies
Full configuration	8 power supplies
Physical characteristics	Height: 1.5 inches (3.8 cm) Width: 4.2 inches (10.6 cm) Depth: 14.5 inches (36.8 cm) Weight: 5.3 lb (2.4 kg) Packaged weight: 6.15 lb (2.80 kg)
Input	Rated inputs: Low range: 100 to 120 V~, 60/50 Hz, 13 A maximum each power supplyHigh range: 200 to 240 V~, 60/50 Hz, 13 A maximum each power supply Input ranges: Low range: 90 to 132 V~, 47 to 63 Hz, 15.4 A High range: 185 to 264 V~, 47 to 63 Hz, 14.6 A Power supply input socket: IEC 320 C20 Minimum wire size: 16 AWG (1.0 mm^2) copper stranded
Output	DC voltage output range: 47.5 to 48.5 V⎓ Nominal DC output: Low range: 48 V⎓, 50 A maximum each power supplyHigh range: 48 V⎓, 25 A maximum each power supply DC output power: 2500 W @ high range for one power supply1250 W @ high range for one power supply
Efficiency	90 % typical at full load
Operating conditions	Operating temperature: –10° C to 50° C Storage temperature: –40° C to 85° C Operating humidity: 10% to 95% relative humidity, non-condensing Operational shock: 30 m/s^2 (3 g)

Power Cord Requirements

Power cords for use on BlackDiamond X8 AC power supplies have specific requirements.

- The power supply cord must be agency-certified for country of use, and rated at 13 A by in-country regulatory authority.
- The power supply cord must have an IEC 320 C19, straight plug to connect to the IEC320 C20 connector on the power supply.
- The power cord must have an appropriately rated and approved wall plug applicable to the country of installation.
- For cords up to 6 feet (2 m) long, the wire size must be a minimum of 16 AWG (1.0 mm^2).

Connector Pinouts

The following table shows the pinouts for the RJ-45 console port on the BlackDiamond X8 switch.

Table 24: RJ-45 Console Port on BlackDiamond X8 Switch

Function	Pin Number	Direction
CTS (clear to send)	1	In
DTR (data carrier detect)	2	Out
TXD (transmit data)	3	Out
GND (ground)	4	—
GND (ground)	5	—
RXD (receive data)	6	In
DSR (data set ready)	7	In
RTS (request to send)	8	Out

The following table shows the pinouts for an RJ-45-to-DB-9 adapter.

Table 25: Pinouts for an RJ-45 to DB-9 Adapter

Signal	RJ-45 Pin	DB-9 Pin
CTS (clear to send)	1	8
DTR (data carrier detect)	2	6
TXD (transmit data)	3	2
GND (ground)	4	5
GND (ground)	5	5
RXD (receive data)	6	3
DSR (data set ready)	7	4
RTS (request to send)	8	7

Figure 78: Null-modem Cable Pinouts on page 117 shows the pinouts for a 9-pin to 25-pin (RS-232) null-modem cable.

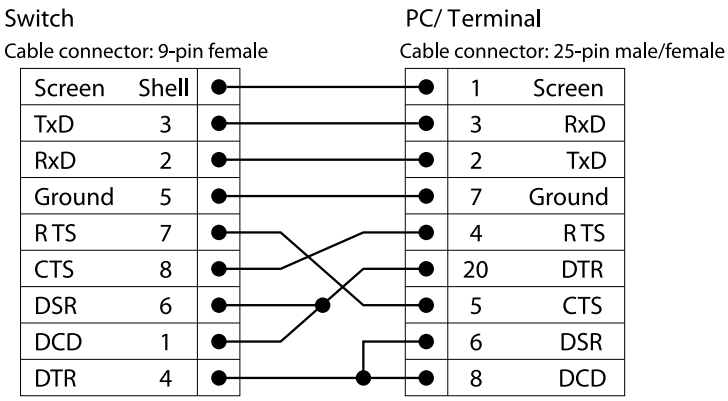

Figure 78: Null-modem Cable Pinouts

Figure 79: PC-AT Serial Null-modem Cable Pinouts on page 117 shows the pinouts for a 9-pin to 9-pin (PC-AT) null-modem serial cable.

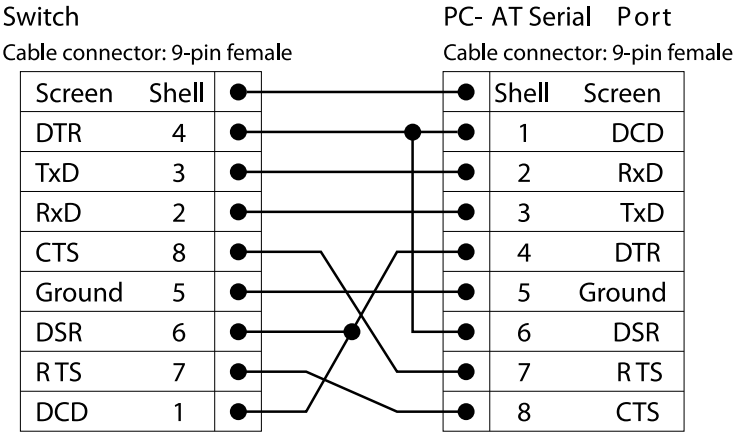

Figure 79: PC-AT Serial Null-modem Cable Pinouts

Conformity Statements for EMC Class A

International—CISPR 22 Class A

This is a Class A product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate remedial measures.

FCC Class A

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference, in which case you are required to correct the interference at your own expense.

Canada Class A

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

Class A Notice for Taiwan

Warning

This is a Class A product. In a residential environment this product may cause radio interference, in which case the user may be required to take appropriate measures.

警告使用者：這是甲類的資訊產品，在居住的環境中使用時，
可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策

警告:此为A级产品，在生活环境中，该产品可能造成
线电干扰。在这种情下，可能需要用户对干扰采取切
实可行的措施。

Japan (VCCI Class A)

This is a Class A product based on the standard of the VCCI Council. If this equipment is used in a domestic environment, radio interference may occur, in which case the user may be required to take corrective actions.

この装置は，クラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。 VCCI－A

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